# ELECTRICAL REVIEW

18th SEPTEMBER, 1953

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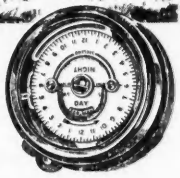

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ELECTRICAL REVIEW 18th SEPTEMBER, 1953

THE OLDEST ELECTRICAL PAPER • ESTABLISHED 1872 • VOL. 153 • NO. 12

# H.V. Circuit Breaking

THE nature of the problems raised by the need to transmit larger blocks of power for longer distances, and hence at higher voltages, is a staple feature of the biennial C.I.G.R.E. meetings. Among the papers presented last year was one relating to the projected 315–330 kV transmission system of the American Gas and Electric Co., in which reference was made to the installation of 15,000 MVA circuit breakers. The first of these units has now been delivered and from the particulars given on page 645 the magnitude of the factors involved can be gauged—mechanical because of their great dimensions and electrical because of the requirements of insulation and of ability to open successfully on heavy short circuits.

Comparison with the British supergrid at 275–300 kV (an international standard) suggests itself, since although the U.S. company's output is much smaller there are certain relevant similarities between the two. Existing highest voltages (132 and 138 kV) are about the same and the new voltages are reasonably close to one another. The primary problem in each case is not one of transmitting energy over very great distances but the need—more complex in many respects—to cope with load and plant developments in a closely interconnected network. The U.S. basis of rating rupturing capacity is not stated, but it probably differs from that adopted here, where 7,500 MVA breakers at 275 kV, now available, will be enough to meet initial requirements, though 10,000 MVA is under consideration for later developments. These figures compare with 8,500 MVA of the Swedish 380/400 kV system for long distance transmission.

Whereas the switchgear of the American company is all of the bulk oil-immersed type, the units ordered by the B.E.A. from several manufacturers include both bulk-oil and air-blast designs. In both countries provision is being made for high speed three-phase auto-reclosure. The decision by the B.E.A. and the American

company to raise the voltage follows a common line of reasoning. This includes the need to improve operational flexibility with growth of electrical demand and consequent larger ratings of generating sets. Higher voltages will facilitate the apportioning of loads between power stations for economy or in emergency—all at the least cost having regard to anticipated progress over the next twenty to thirty years. Within that period conditions in this country will no doubt call for the operation of some of the 275 kV lines at 400 kV, for which provision is now being made.

## CONTRACTING DISPUTE

As it proved impossible to refer the dispute in the electrical contracting industry to the Industrial Disputes Tribunal or the Industrial Court, the Minister of Labour decided last week to set up a court of inquiry. Such a court is asked to sort out the facts of the case; its report serves as a guide to the Minister in his further approach to the parties and informs the public whose sympathies may have some influence upon the disputants. As a result of the Minister's decision both the Electrical Trades Union and the National Federated Electrical Association have refrained from further action and on Monday the Union announced that it strongly recommended its striking members to return to work yesterday (Thursday). It is to be hoped that the court of inquiry's findings will herald a return to peaceable discussion and settlement.

## JOINT CONSULTATION

In 1949 there were set up in the electricity supply industry a National Joint Advisory Council, 15 District Councils and about 450 local committees, representative of the B.E.A. and Electricity Boards. The purpose of these bodies is to make recommendations to the B.E.A. and Boards on matters affecting the safety, health and welfare of employees and on education and training. The report of the N.J.A.C. for 1952–53 shows that a wide variety of subjects is being dealt with—from long-service certificate design to safety rules. Fifteen recommendations were made and these seem to have been generally accepted. It is considered that relationships between the Boards and their staff are greatly strengthened by this organization.

## SMALL EXPORTERS

Willing and able though they may be, small firms find it difficult to enter, and stay in, overseas markets. Assistance is available to them but they are not always aware of this, nor is the assistance always appropriate or adequate. The Board of Trade's services to exporters are very good so far as they go and so far as they are known. Nevertheless, in the opinion of the Select Committee on Estimates, there is scope for the expansion of these services and for publicizing them more. It is, of course, not easy to find good all-round commercial diplomatic representatives for our foreign embassies, but the proposal that they should be appointed from the staff of the Board of Trade, rather than from the Foreign Office, would go some way towards meeting this need.

## CHEMICAL ENGINEERING

Advances in electrical engineering are probably rivalled in rapidity and variety only by those in chemistry, to which our own industry owes so much. The relationship between the two has within recent years become close enough to warrant the creation of a new group of technical workers—chemical engineers. Recognition in this country of their growing importance to industry is inadequate, as Sir Harold Hartley has stated at the Institution of Chemical Engineers. A large increase in numbers of highly qualified chemical engineers, with provision for training them, will be necessary to give Britain a leading position in this expanding field.

# Domestic Heating Elements

## *Trends in the Development of Nickel-Chromium Alloys*

By H. HODGES, B.Sc.*

THE advantages of electricity for controlled heating in both domestic and industrial equipment were apparent to all the early pioneers of the electricity supply industry. These advantages could not be realized until two conditions were fulfilled: first a reliable and reasonably cheap supply of electricity, and secondly metallic resistors which were capable of operating for long periods at high temperatures without excessive oxidation or loss of mechanical strength.

Both of these conditions were fulfilled within the first decade of this century, the one by electricity supply undertakings, and the other by metallurgists in the United States, the United Kingdom and Germany, who invented and then made commercially available the nickel-chromium and nickel-chromium-iron alloys. A large number of alloys were investigated, all based on nickel, chromium and iron, and two were selected for commercial production by reason of their outstanding heat resisting properties, these being the 80/20 and the 60/16/24 nickel-chromium and nickel-chromium-iron alloys, respectively.

There is no doubt that the 80/20 nickel-chromium alloy in particular was difficult to manufacture with the metallurgical knowledge and equipment available to the early producers. This may have accounted for the fact that primary production was confined to a relatively few producers who first developed the manufacturing skill and then applied intensive research to the subject.

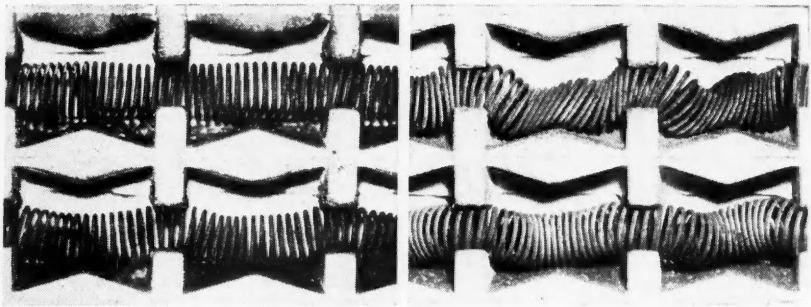
It is interesting to consider why two alloys which were developed more than 40 years ago should still, without substantial modification of composition, remain almost unchallenged in this field, despite great

* A member of the Technical Service of Henry Wiggin & Co., Ltd.

**Table 1.—Mechanical Properties of Nickel-Chromium Alloys***

| | Temp deg C | 20 | 400 | 500 | 600 | 700 | 800 | 900 | 1,000 |
|---|---|---|---|---|---|---|---|---|---|
| *"Brightray" C & S* | Max. stress tons/sq in | 47·5 | 40·5 | 39 | 32·5 | 25·5 | 13·5 | 8 | 4·5 |
| | Elongation per cent on $\sqrt{4}$ area | 47 | 46 | 46 | 27 | 26 | 36 | 43 | 68 |
| | Reduction of area per cent | 63 | 56 | 56 | 28 | 29 | 48 | 61 | 67 |
| *"Brightray" B* | Max stress tons/sq in | 44·5 | 38·5 | 36 | 31·5 | 23 | 16 | 9·5 | 6·5 |
| | Elongation per cent on $\sqrt{4}$ area | 44 | 41 | 41 | 22·5 | 31 | 49·5 | 72 | 84 |
| | Reduction of area per cent | 66 | 59 | 52 | 25 | 29 | 40 | 50 | 56 |
| *"Brightray" F* | Max stress tons/sq in | 47 | 40 | 35 | 29·5 | 19·5 | 10·5 | 6 | 5·5 |
| | Elongation per cent on $\sqrt{4}$ area | 38 | 36 | 33 | 45 | 66 | 93 | 112 | 124 |
| | Reduction of area per cent | 50 | 54 | 44 | 38 | 54 | 71 | 71 | 83 |

* This table and Table 2 have been abstracted from the "Electrical Handbook," Edition, June, 1948, published by Henry Wiggin & Co., Ltd. The materials were listed as hot rolled and annealed bar, the test pieces being strained at a common rate of 0·244 in/min. "Brightray" C and S are 80/20 nickel-chromium alloys, "Brightray" B is a nickel-chromium-iron alloy, and "Brightray" F is a nickel-chromium-iron-silicon alloy.



**Figs. 1 and 2.—80/20 nickel-chromium and iron-chromium-aluminium fire bars after 14 months' continuous operation**

metallurgical advances in the meantime and despite every possible incentive to the discovery of alternative materials. Not even during the period of the 1939–45 war when nickel became scarce were these two alloys replaced to any great extent. The only important alternatives which have been developed are the alloys of iron, chromium and aluminium, and these are largely used for furnace elements where the element temperature exceeds that permissible with the 80/20 alloy. Such pre-eminence of the latter alloy in particular can only be explained by natural advantages which have been enhanced by continuous research by the primary producers.

## Properties of 80/20 Alloy

The 80/20 alloy develops a highly-protective oxide when heated so that the alloy is resistant to progressive oxidation. The alloy's mechanical properties are retained at high temperatures to an unusual degree (see Table 1), which is a most important factor in preventing sag and failure from elongation of the resistor in service. Comprehensive information on the creep resistance (the slow deformation under low stresses for long periods) of the alloy in the temperature range 800 to 1,000 deg C is not available, but it is perhaps significant that the starting point in developing the "Nimonic" series of creep resisting alloys was an investigation into the high temperature properties of alloys of the 80/20 type. Further indication of the good high temperature mechanical properties of these alloys is that they are frequently used for wire conveyor belts in bright annealing furnaces for copper brazing where the furnace temperature is about 1,120 deg C.

Mechanical strength and sag resistance at high temperatures are of vital importance to the designer of both domestic and industrial heating elements.

Figs. 1 and 2 show the difference in appearance between spirals of 80/20 nickel-chromium and those of an iron-chromium-aluminium alloy working at the same temperature in an electric fire bar after fourteen months' continuous operation. Another factor of almost equal importance is that these alloys are not easily embrittled at high temperatures.

The more important physical properties of the nickel-chromium and nickel-chromium-iron alloys are given in Table 2, and it will be seen from the temperature/resistance curves (Fig. 3) that they possess a conveniently high electrical resistance combined with a fairly low temperature coefficient of resistance. Moreover these

**Table 2.—Summary of Typical Physical Properties of Nickel-Chromium Alloys**

| Property | Type A | Type B | Type C |
|---|---|---|---|
| Specific gravity | 8·36 | 8·28 | 8·53 |
| Melting range deg C | 1,400–1,420 | 1,400–1,420 | 1,350 |
| Linear coeff. expn. per deg C at 100 deg C | $12·5 \times 10^{-6}$ | $12·5 \times 10^{-6}$ | $14·2 \times 10^{-6}$ |
| Specific heat | 0·1026 | 0·112 | — |
| Electrical resistance at 20 deg C (microhms/cm) | 110–116 | 110 | 108 |

Type A alloy = 80 nickel, 20 chromium; Type B alloy = 60 nickel, 16 chromium, 24 iron; Type C alloy = 37 nickel, 18 chromium, 43 iron, 2 silicon.

alloys weld readily, so that good electrical joints can be made, and they have good room temperature tensile and elongation properties, so that mandrel wound spirals will subsequently stretch evenly and uniformly.

The versatility of the 80/20 alloy is illustrated by the fact that it retains its protective oxide not only in oxidizing, but also in reducing atmospheres of the type which are used for bright annealing copper, stainless steel and high nickel non-ferrous alloys, and for copper brazing. It is not generally suitable in sulphur-bearing atmospheres, though it is more resistant to these atmospheres when they are oxidizing than when they are reducing. Under certain conditions it may be attacked by "green rot," which is referred to later.

## Oxide Scale Adherence

It is necessary, not only that the oxide film developed by the alloys in question when heated should hinder the access of oxygen to the metal underneath, but also that it should itself be adherent to the parent metal. Intermittent heating will, of course, accentuate any tendency on the part of the scale to flake. The greater part of the research which has been carried out on the 80/20 alloy in America, the United Kingdom and other European laboratories has been devoted to investigating the nature of this oxide scale and to devising means of so modifying the scale that it is "keyed" firmly and adherently to the parent metal.

Effective research into this problem required first a test which would provide an agreed measure of the oxidation resistance and of the scale adherence. A large number of such tests were investigated, but the one now commonly accepted is that of the American Society for Testing Materials ("Accelerated Life Test for Metallic Materials for Electrical Heating": A.S.T.M. Designation: B76–39) first proposed in 1929 as a tentative specification, adopted in 1933, revised in 1936 and last revised in 1939. This test gives a measure of the *relative* life of different materials under the test conditions and was designed to give results within about 100 hours of test.

It is not pretended that this test simulates service conditions or that conclusions as to the behaviour of any particular heating element under service conditions could be directly related to the test. Nevertheless, it is generally agreed that it has proved useful to manufacturers in the routine testing of their products and has proved of research

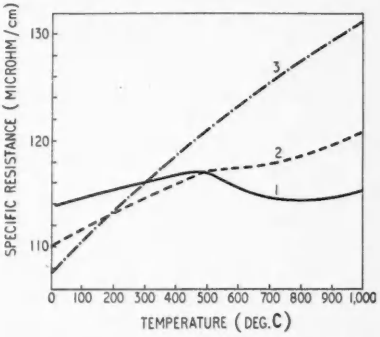
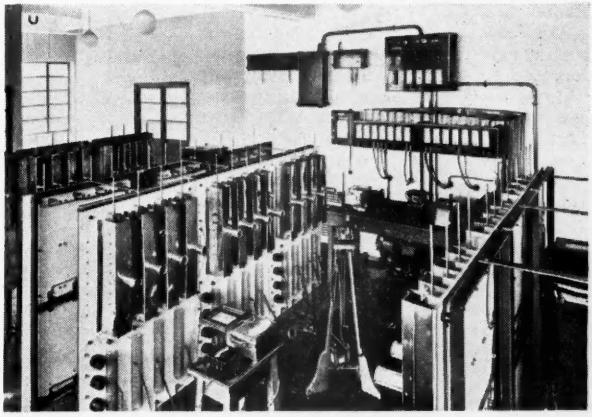



**Fig. 3.—Temperature/resistance curves for nickel-chromium and nickel-chromium-iron alloys**

1.—80/20 nickel-chromium alloy. 2.—60/16/24 nickel-chromium-iron alloy. 3.—37/18/43/2 nickel-chromium-iron-silicon alloy

**Fig. 4.—Life test equipment in the Research Laboratories of the Mond Nickel Co.**



value in that it has provided a " yardstick " by which the comparative oxidation and scaling resistance of different alloys in the form of wire can be measured.

Fig. 4 illustrates part of the life testing equipment in the Research Laboratories of the Mond Nickel Company in which a wire of about 20 s.w.g. diameter is suspended vertically between two contacts and a weight of about 10 grammes (equivalent to 35 lb/sq in) is attached to the end of the wire. The wire is enclosed in a draughtproof box and is heated electrically to a very high temperature which is measured by an optical pyrometer. The voltage is adjusted to bring the wire to the test temperature at the start and again after two hours; thereafter the voltage is maintained constant. The wire is subject to a two minute on and a two minute off heating and cooling cycle, and the life is measured to burn-out or to a 10 per cent increase in resistance; in practice such an increase has never been recorded with the 80/20 alloy.

## Improved Performance

Obviously such a test is a severe measure of both oxidation resistance and scale adherence. The extraordinary improvements which have been made to the 80/20 alloy are shown in Fig. 5, which illustrates how the test temperature has had to be continually raised in order to obtain failure of the test specimens within a reasonable period. The test temperature was first fixed at 1,066 deg C. It was shortly afterwards raised to 1,120 deg, and then again increased to 1,177 deg, at which it now stands.

Wire now produced in this country has such a long life that one manufacturer has modified the test by raising the temperature to 1,232 deg C. By making comparisons with standard test specimens it can be shown that a life of 100 hours at 1,232 deg C is approximately equivalent to a life of about 300 hours at 1,177 deg C, and would correspond to a life of the order of 3,000 to 4,000 hours at the original test temperature of 1,066 deg, i.e., 30 to 40 times the life envisaged when this test was devised in 1929.

This tremendous improvement has been achieved as a result of a large number of refinements in the production of the alloy and by a series of important discoveries, the first of which was made in the early 1930's. The initial difficulties in the manufacture of these alloys have all been overcome and an extremely close control is exercised over all the processing operations, from the selection of the raw materials, through melting, hot rolling and wire drawing to the inspection and life testing. It is now common practice to make a life test on a pilot sample from each heat melted and to defer the processing of the particular heat until the life test has been approved.

It was discovered in the early 1930's that certain elements present, in minor amounts only (usually less than 0·5 per cent), could have a quite dramatic effect on the life of wire as tested by the A.S.T.M. method. Systematic investigation since then has shown that the elements concerned are all highly reactive, e.g., elements such as calcium, cerium, zirconium, silicon and aluminium, and that they achieve the result by modifying the nature of the key between the oxide and the metal, as is indicated in Figs. 6 and 7.

Whereas it was at one time considered good to obtain lives of 100 hours on an 80/20 alloy at 1,066 deg C, it is now not uncommon to record lives of 400 hours at 1,177 deg C, and occasionally lives of 700 or 800 hours, or even more, are recorded. Alloys with these exceptionally long lives are regarded as a fruitful point from which to start further research.

One of the incidental effects which has accompanied the increase in the test life

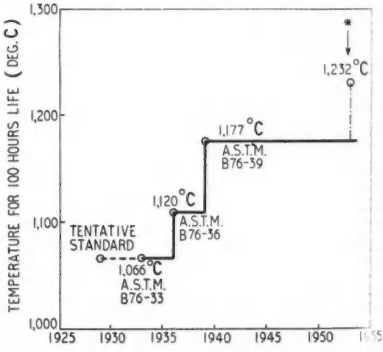
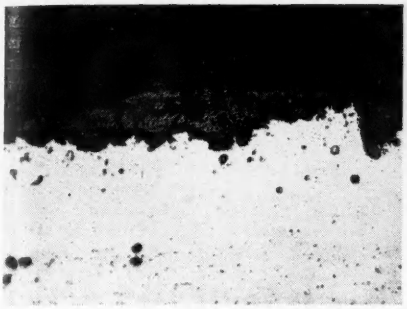



**Fig. 5.—Improvements in 80/20 nickel-chromium alloys since 1930**

* Modified A.S.T.M. test adopted by the Research Laboratories of the Mond Nickel Co.



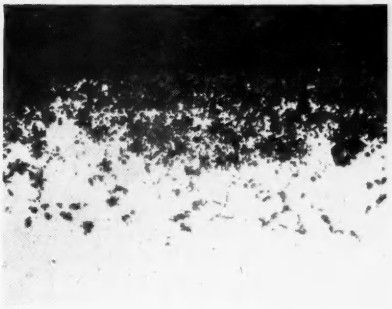


**Fig. 6.—Scale/metal interface "short life" and Fig. 7 (right) "long life" on 80/20 wire**

obtained during recent years is an increase in specific resistance. Manufacturers' catalogues still list the specific resistance of the 80/20 alloy in the stabilized condition as about 107–110 microhms/cm, whereas, in fact, it will be found that several manufacturers are now producing alloys with a specific resistance of from 110–116 microhms/cm. This is perhaps a convenient point at which to draw attention to a fact insufficiently recognized by the designers of electrical heating equipment; viz., that the specific resistance of all types of the 80/20 alloy is affected by the rate at which it is cooled from the annealing temperature. This applies particularly to bright annealed wire which is continuously strand annealed in an atmosphere of dry cracked ammonia under conditions where the wire is practically quenched as it leaves the hot zone, the finished wire having a specific resistance of about 4 per cent less than that of wire which has been slowly cooled, as happens when the wire is allowed to cool off in the furnace. Bright annealed wire will revert to the stable resistance on heating above 450 deg C, so that provided allowance is made for this fact in the original calculation it is of no consequence.

## "Green Rot" Control

Although the form of attack on 80/20 nickel-chromium alloys known commonly as "green rot" concerns industrial furnace elements only, a short description is given as a matter of general interest. This generally involves exposure of the heating elements or furnace parts to atmospheres which are marginally oxidizing, that is oxidizing to chromium and reducing to nickel. The attack involves the formation

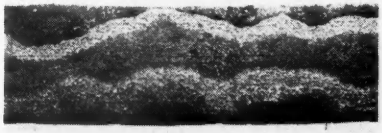


**Fig. 8.—"Green rot" attack on an 80/20 nickel-chromium wire**

of a chromium compound in the matrix of the metal and its subsequent oxidation in the same atmosphere. Thus oxidation can proceed internally and the natural protective film is broken. Typical mechanisms possible are carburization and oxidation, or sulphidation and oxidation.

The control of "green rot" can be achieved by alteration of the furnace atmosphere and by preventing contaminants such as carbon and sulphur being introduced into the furnace with the work. Recent research has shown that nickel-chromium-iron alloys containing substantial amounts of iron and some silicon are more resistant to "green rot" than the 80/20 alloy, and a typical alloy of this composition is "Brightray F" of the nominal composition, 43 per cent iron, 37 per cent nickel, 18 per cent chromium and 2 per cent silicon. This alloy may be used for furnace elements operating up to 1,000 deg C in both oxidizing and reducing atmospheres and for furnace conveyor belts.

The nickel-chromium and the nickel-

chromium-iron alloys have shown themselves versatile and capable of development to the point where they meet all the requirements of modern electric heating appliances subject only to an upper limit on the operating temperature of the element of 1,150 deg C. Further research is at present in hand with the object of raising this limit and an alloy already being tested in the laboratory shows excellent promise of being suitable for furnace elements with a maximum operating temperature of 1,250 deg C.

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# Fluorescent Lamp Development

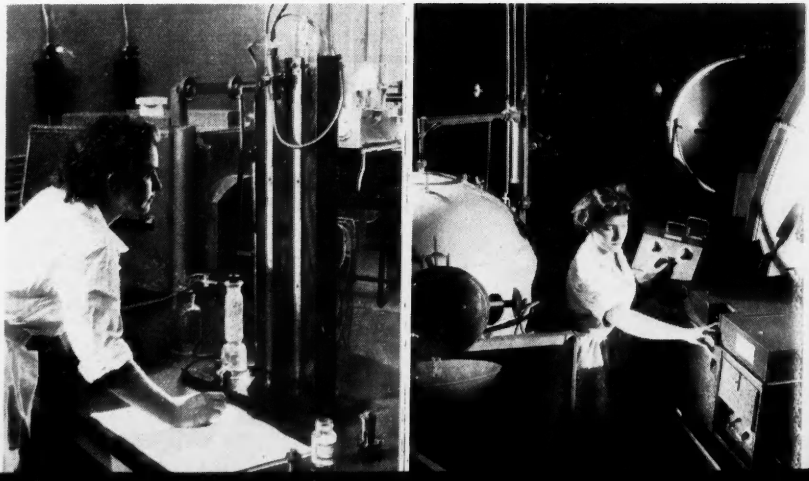
## *Close Co-operation of Laboratories and Works*

RECENT improvements in the development and production of fluorescent lamps were demonstrated to a Press party at the Research Laboratories of the General Electric Co., Ltd., at Wembley last week. In welcoming the visitors, Mr. O. W. Humphreys, director of the laboratories, spoke of the advantages derived from having a centralized establishment of this kind in which the activities of specialists in many directions were integrated. He said that the arrangement prevented the specialists from pursuing their own particular researches without regard for what others were doing. By formal and informal criticism and suggestion their work was co-ordinated and directed to the general advancement of the whole. Mr. Humphreys also mentioned that about half of the G.E.C.'s expenditure on research (amounting to £2½ million a year) was absorbed by work for the Government.

At the end of the tour Mr. W. J. A. Woodward, manager of the Osram-G.E.C. Lamp and Metals Factories, gave a brief lecture on the actual production of fluorescent lamps at the Shaw works, near Manchester. He particularly stressed the strong liaison between the laboratories and the works.

The company claims that new techniques and manufacturing methods now being introduced will result in an increased light output from the lamps principally used in industry of 12½ per cent for the same electricity consumption and greater reliability

*Left:* **Apparatus for measuring particle size by determining the resistance to a known air flow of a "bed" of powder of specified thickness.** *Right:* **Measurement of total light output and investigations into the precise colour and spectral composition of the light emitted by the use of a G.E.C. "physical eye" photometer and colorimeter in conjunction with a 12ft light integrating sphere (on right)**



and life. It was explained to the party that the three main directions in which research has contributed to the improvement of the fluorescent lamp have been in finding the best formula for and correct structure of the fluorescent powder; the best method of depositing the powder on the inside of the tube; and a design of cathode to ensure the most satisfactory operation.

The halophosphate powders developed in the laboratories in 1946 are now being used all over the world. Very close control of the structure and purity of the powder is essential. Particle size must not be uniform but must vary only between limits of the order of ten thousandths of an inch and the different sized particles have to be distributed evenly throughout the powder.

Accurate chemical and spectroscopic methods of detecting and controlling impurities have been developed, for the luminosity of the powder can be considerably modified by extremely minute traces of these impurities.

It is essential that the light from tubes of each class shall be of standard colour to give them identical appearance and colour-rendering properties. For this purpose a new method of measuring colour has been evolved—a " physical eye " photometer and colorimeter being employed in conjunction with a 12ft integrating sphere.

Uniformity and adherence of the powder to the inside of the tube involve the use of " binders " which maintain the powder in even suspension and hold it on to the tube before the baking process, when the binders are volatilized. After baking, the film of powder is intimately locked with the internal surface of the tube.

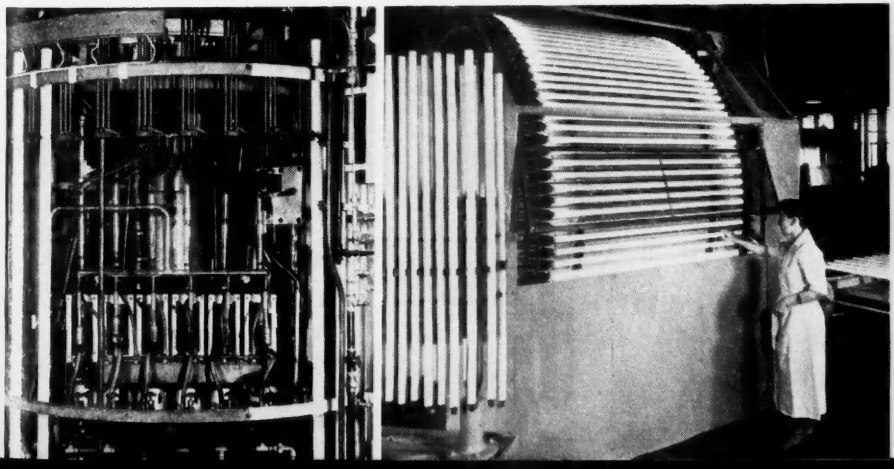
The discharge in a fluorescent tube is started and maintained by a coiled tungsten cathode coated with a thermionically emissive compound. To ensure the correct functioning of the tube the shape of the coiled cathode and the chemical and physical properties of the coating must be closely controlled and much attention has been given to this in the laboratories.

At the Shaw factory the techniques worked out by the laboratories are put into practice and the close collaboration between the two establishments has resulted in the factory's ability to reproduce laboratory results on a mass-production scale.

Highly specialized coiling machines working to limits of a few ten-thousandths of an inch produce the coiled-coil wires for the cathodes. The cathodes are fixed to nickel lead-in wires on a new design of multi-head automatic assembly machine, claimed to be the fastest and most accurate machine of its type, which has been copied by American manufacturers. The works engineers have developed and perfected an automatic process in which the temperature of the cathode coating is constantly controlled to within 1 deg C. A close check on fluidity is maintained and all atmospheric dust is eliminated. By exact timing and mechanical precision an amount of coating, correct to within 0·00004 oz, is applied to the coil. The methods adopted have eliminated any tendency for the tube ends to blacken.

A new design of automatic vacuum pumping machine not only increases the

*Left:* **One of the new automatic pumping machines installed at the Shaw works, embodying "mercury dosing," a new development in high speed exhausting.** *Right:* **Automatic stabilizing machine which ensures the uniformity of electrical characteristics of all mains operated fluorescent tubes. A conveyor on the left delivers tubes to the machine and the stabilized tubes are taken away on the right**



rate of production of fluorescent tubes but has considerably improved their performance. For the extraction of the air in the tube, together with a considerable volume of carbon gases from the component parts of the tube during processing, an automatic pumping machine has been produced which introduces a new development in high-speed exhausting known as "mercury dosing." Tiny globules of mercury are introduced to the tube during the pumping operation at predetermined intervals, a process which obtains the final vacuum in the shortest time.

New automatic stabilizing machines installed at the works were designed and built by G.E.C. engineers and are said to represent one of the greatest advances in the production of fluorescent tubes. Stabilizing produces the correct condition of activation in the cathodes and is virtually a running-in process which stabilizes the striking, or starting voltage, of the cathodes so that there shall be no possibility of variation in this respect in the finished product. For this purpose the stabilizing machine is fitted with a complex system of voltage regulating gear.

The high uniformity of "Osram" fluorescent tubes is maintained by careful measurement and testing at every stage of manufacture. The most modern designs of electronic instruments are used and the results are automatically tabulated to provide vital information for both the works and research laboratories. The checks include X-ray analysis of the fluorescent powders before mixing; photo-micrographs to determine size and shape of powder particles; measuring by a "reflectometer" the thickness of powder film applied to the tube; electronic check on the cooling time of a heated cathode against a standard cathode to determine the distribution of the coating on the cathode; checking physical dimensions of tube; measuring light output; and assessing the colour of light according to international standards by use of a colorimeter.

## Power Position in Sydney

FROM 1st January, 1952, the Electricity Commission of New South Wales took over generation and bulk supply of electricity in the areas previously supplied by the Sydney County Council. Consequently the latter authority's report for 1952, just received from the general manager (Mr. C. E. Ranger), is a much smaller document, confined to transmission and distribution.

Restrictions on the use of electricity were continued throughout the year but were eased during the last three months when the power position improved. Sales totalled 1,140·0 million kWh (against 1,125·8 million kWh in 1951), of which industrial supplies accounted for 517·6 million, residential 475·9 million, commercial 126·6 million and public lighting 20 million. Income amounted to £13,822,397 (£10,055,885) and expenditure to £13,781,272 (£12,193,963), leaving a surplus of £41,125. An additional 5,135 consumers were connected during the year, making the total number 315,416. The supply to 749 consumers was changed over from d.c. to a.c. and £78,053 was spent on the conversion scheme (making altogether £676,779 to date).

## B.E.A. Plant Contracts

*Month's Total £7 Million*

CONTRACTS have been placed by the British Electricity Authority during the past month for power stations, transforming stations, and transmission lines amounting in the aggregate to £7,063,046. The principal contracts include the following:—

Brighton "B" power station: Piling for foundations for two turbo-generator sets.—Holloway Bros. (London).

Cowes station: Superstructure.—John Croad, Ltd.

South Denes station, Yarmouth: Two 550,000 lb/hr boilers.—International Combustion. Two 60 MW turbo-generators and auxiliary apparatus.—Metropolitan-Vickers. Condensing and feed heating plants for two 60 MW turbo-generators.—Vickers-Armstrongs.

Castle Donington station, nr. Derby: Main building superstructure.—Taylor Woodrow Construction, Ltd.

Northampton station: Steel framework to boiler house and turbine house.—Dorman Long & Co.

Nottingham station: Foundations and culverts.—Taylor Woodrow Construction. One 72 MVA and one 6 MVA transformers.—Metropolitan-Vickers.

Hams Hall "C" station, nr. Birmingham: 3·3 kV auxiliary switchgear.—A. Reyrolle & Co.

Meaford "B" station, Stone, Staffs: One 515,000 lb/hr boiler.—Babcock & Wilcox.

Uskmouth station, Newport: Condensing and feed heating plant for one turbo-generator set.—Vickers-Armstrongs.

Doncaster station: Second section of superstructure.—J. Gerrard & Sons.

Ferrybridge "B" station, Yorks: Generator transformer.—C. A. Parsons & Co. Two 10 MVA transformers.—Fuller Electrical and Manufacturing Co.

Barony station, Ayr: Structural steelwork for main building and annexes.—Colville Constructional Co.

Andover substation, Hants: 132 kV 2,500 MVA switchgear.—B.T.H. Co.

Elstree substation: Site and foundation works.—J. L. Eve Construction Co.

Staythorpe substation, Newark: Site and foundation works.—M. J. Gleeson (Contractors), Ltd.

Pyle substation, Glam.: 132 kV switchgear.—English Electric Co.

Creyke Beck substation, Yorks: 132 kV 2,500 MVA switchgear.—A. Reyrolle & Co.

Ferrybridge "B" substation, Yorks: Site and foundation works.—M. Harrison & Co. (Leeds), Ltd.

# A PROFITABLE SIDE-LINE

## *Pig and Poultry Rearing Aided by Electricity*

THE note published in our issue of 10th July, page 105, on the use of electric trucks in pig rearing prompted Mr. F. Smith, proprietor of Smith's Refrigeration, to invite us to visit his home at Oakdene, Chelsfield, Kent, where he, too, uses electric trucks as well as a number of other electrical appliances for both pig and poultry rearing and also for horticulture.

Begun on a very small scale as a hobby about six years ago, this enterprise has grown into a profitable side-line with stock now comprising 200 pigs and 700 chickens. Nevertheless, thanks to the electrical aids employed, Mr. Smith's wife and young lad between them manage to do all the necessary work, assisted by Mr. Smith at weekends and on one day during the week.

Practically all the electrical equipment used is second-hand and has been adapted for the purpose. The three trucks employed cost only just over £30, excluding the batteries, which were bought separately from the D.P. Battery Co., Ltd. One of the vehicles used was an old Tomkinson baker's truck (24 V) which has been fitted with a tank holding ½ ton of pig food, aircraft hydraulic landing gear being adapted to give the necessary tipping facilities. Another vehicle (24 V) previously used for railway luggage has been similarly converted to take 200 gal of swill, and the third truck, an Express Dairy truck (12 V) is used for general transport of pig food, bins, etc. A trailer is available for attaching to any of the vehicles and a fourth electric truck is being made up for carrying manure.

G.E.C. infra-red lamps are employed for pig farrowing (two to each litter) and also for chicken rearing. The value of this device can be judged from the fact that of 350 Rhode Island Red–Light Sussex cross day-old chicks bought, only six were lost. The battery system of egg production has been adopted, with an automatic electrically operated food and water conveyor system, the food being prepared in an old Hobart mixer. The pig food is cooked by means of two coal-fired boilers which are hand stoked and are fitted with audible warnings operating when the steam temperature falls unduly. Artificial lighting increases winter egg production. All the troughs used both for pigs and chickens, as well as most of the other necessary metalwork, have been fabricated on the premises by means of portable welding apparatus.

Two greenhouses have been electrically equipped. One of them used for growing grapes is completely automatic, a thermostat

**Mr. F. Smith has converted three electric trucks for use in pig rearing.** *Right:* **The use of infra-red lamps has greatly reduced mortality among chickens**

controlling both tubular heaters and a motor driven roof window. A searchlight has been installed to illuminate the whole of the main outside working area.

Apart from a deep freeze chest, the domestic electrical equipment of the premises includes a 7½ cu ft G.E.C. refrigerator, a "Goblin" washing machine, a 2 kW immersion heater, radiators, clocks, radio and television apparatus. There is fluorescent lighting in the living room.

In addition to taking an electricity supply from the South Eastern Electricity Board, Mr. Smith has installed a 7½ kVA Turner-Brush diesel generator set which is capable of supplying practically the whole of his electrical needs. Change-over switches make it possible to take supplies from either the mains or the diesel set for various sections of the installation as desired. A Westinghouse battery charger has been provided for the electric vehicles.

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# I.E.E. SECTION CHAIRMEN

*Biographical Notes of the Officers for* 1953-54

THE London meetings of the Institution of Electrical Engineers for the 1953–54 Session commence on 8th October when Mr. H. Bishop, the President, will deliver his inaugural address. Biographical notes and a portrait of the new president were published in our issue of 17th July (p. 129), and we now give brief notes, together with their portraits, of the chairmen of the specialized Sections. We hope to deal similarly with chairmen of the Centres and Sub-Centres in later issues.

MR. L. G. BRAZIER, Ph.D., B.Sc., A.F.R.Ae.S., Fellow. A.I.E.E., F.Inst.P. (Supply Section) is a director, and director of research, of British Insulated Callender's Cables, Ltd. He was educated at Sidcot, and the City and Guilds College, London University, and in the 1914–18 war was a pilot in the R.F.C. and R.A.F. with service in Flanders. From 1923 to 1925 he carried out mathematical research at the Royal Aircraft Establishment on aircraft structures and elastic stability. He joined Callender's Cable & Construction Co., Ltd., in 1925 and for some years worked on problems connected with trunk telephone cables, but from 1928 he specialized in h.v. transmission research and development work. This led to the development of the impregnated pressure type of cable for the highest voltages for underground transmission. After the amalgamation of Callender's with British Insulated Cables, Ltd., Dr. Brazier was appointed director of research of the amalgamated company.

MR. J. F. COALES, O.B.E., M.A., F.Inst.P. (Measurements Section) was educated at Berkhamsted School and Sidney Sussex College, Cambridge. He joined the Department of Scientific Research, Admiralty, in 1929, being first employed in the Standards Laboratory of H.M. Signal School, Portsmouth. From 1930 to 1937 he was engaged in research and development of radio direction finding equipment for the Navy and for the next three years was in charge of research and development of decimetre wave radio and radar for the Navy. From 1940 to 1946 he was responsible for the development of all Naval fire control radar. Mr. Coales was awarded the O.B.E. in 1946 for services connected with the development of radar. In the same year he joined Elliott Bros. (London), Ltd., as director of research and built up research laboratories at Boreham Wood which became well known for their original work in electronic, micro-wave and computing machine techniques.

Mr. Coales' interest in higher technological education led to his resignation from Elliott Brothers in October, 1952, to take up his present appointment as assistant director of research in the Engineering Department of Cambridge University to organize research and post-graduate training in servo-mechanisms and control systems.

He has been a governor of Hatfield Technical College since its inception in 1951.

**Dr. L. G. Brazier**
(*Supply*)

**Mr. J. F. Coales**
(*Measurements*)

**Mr. B. L. Metcalf**
(*Utilization*)

**Mr. J. A. Smale**
(*Radio*)

Mr. B. L. Metcalf, B.Sc.(Eng.) (Utilization Section) was educated at Oundle School and took a degree in mechanical engineering at Glasgow University followed by a fourth year at the Royal Technical College where he obtained an associateship of the College. His practical training was obtained at first in the engineering shops of the Beardmore shipyards on the Clyde and later with the Metropolitan-Vickers Electrical Co., Ltd., at Trafford Park. On completing his practical training Mr. Metcalf joined the Metropolitan-Vickers Electrical Export Co. and worked in Japan for a number of years. On his return to Trafford Park he joined the Mining Department and subsequently became chief engineer of the Department. In 1939 he left Metropolitan-Vickers to become chief electrical engineer to Powell Duffryn, Ltd., and at the end of the war joined the Brush Aboe group as their technical director with a seat on the board. Mr. Metcalf took up his present position as chief mechanical and electrical engineer to the National Coal Board in December, 1949.

He is a member of the Institution of Mechanical Engineers, and vice-president of the Association of Mining Electrical and Mechanical Engineers.

Mr. J. A. Smale, C.B.E., B.Sc. (Radio Section) is engineer-in-chief of Cable & Wireless, Ltd. He was educated at Wycliffe College and Bristol University, and served an apprenticeship with the British Thomson-Houston Co., Ltd., at Rugby. Throughout the 1914–18 war he served in the Royal Naval Air Service, being awarded the Air Force Cross. In 1919 he joined Marconi's Wireless Telegraph Co., Ltd., and was engaged on the development of long-distance point-to-point radio-telegraph circuits, the development of h.f. radio receivers, telegraph recorders, frequency shift signalling and a system of f.m. voice frequency channelling, and he was concerned in the preparations for the opening in 1926 of the first transoceanic commercial photo-radio circuit between London and New York.

Mr. Smale was appointed assistant engineer-in-chief of Cable & Wireless, Ltd., in 1934, being responsible for the development of the company's network of radio stations in the United Kingdom and overseas. He became engineer-in-chief in 1948. He has attended most of the C.C.I.T. and C.C.I.R. international conferences since 1928 and the Madrid, Cairo and Atlantic City conferences of the International Telegraph Union. He is a member of the Radio Research Board.

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## Plant Engineers' Refresher Course

THE Education Committee of the Incorporated Plant Engineers announces that for the winter session it has arranged a comprehensive refresher course comprising twenty weekly lectures to be held at Leeds University on Thursday evenings, commencing on 15th October. The course, which is sponsored by Sir Hubert Houldsworth, Q.C., D.Sc., LL.D., Pro-Chancellor of the University of Leeds, and organized in conjunction with leading West Riding industrialists and engineers, is designed to encourage the most effective use of existing knowledge and to promote the application of up-to-date techniques in works engineering practice over a wide field. The fee for the course is three guineas and copies of the syllabus may be obtained from the secretary to the Refresher Course, Department of Engineering, The University, Leeds, 2.

# VIEWS on the NEWS

## By REFLECTOR

ONE of the most completely all-electric houses (" all-electric " houses are not always completely so) is said by *Reveille* to be still unoccupied and available. The place is " Charters," at Sunningdale, Berks, which was built for the late Mr. Frank Parkinson seventeen years ago and passed into the hands of Sir Montague Burton who died last year. Apart from the " ordinary " electrical services (most of which, however, are on an extraordinary scale) there are innumerable devices, especially in the way of lighting, which are like an inventor's dream come true. Anybody with £80,000 to spare can apparently acquire the property; it is said to have cost £136,000.

* * *

We who have been " electrified " for the better part of our lives may not recall the rapture with which we first switched on the power in our homes. But there are still people to whom this rapture comes as, for instance, a correspondent to *Woman's Own*. This lady says:-

> " What a thrilling week it has been ! I have used a kettle that boils in four minutes, a bright auto-controlled iron, a wireless without an accumulator, a cooker that bakes everything as it should be baked, a cleaner that makes carpets look really fresh and clean, and thrown away the candle that sees me to bed. This is my very first week with electricity ! "

* * *

How do people pick up the strange ideas which they include in letters to the Press? In the *Daily Telegraph* a correspondent, discussing road accidents, said: " Then the Road Fund was raided to the extent of £50 million to provide the electricity grid system." He was soon corrected by Mr. O. A. Sherrard, who was secretary to the former Central Electricity Board, which constructed the grid system. Mr. Sherrard points out that the C.E.B., far from receiving any grant, actually declined a Treasury guarantee for its loans (raised in the open market) to avoid the possibility of Government control.

* * *

Writing to the *Financial Times*, a reader asserts that he recently received a bill from the South Eastern Electricity Board made out on the usual form which entailed typed entries in no fewer than eleven columns at the end of which the amount due was shown as exactly one penny. Which makes me wonder in what circumstances an electricity bill can amount to a single copper. One unit by itself would cost this, I suppose, but what about the standing charge?

* * *

The other evening I inspected a very attractive suite of model rooms arranged by a leading lamp manufacturer at a London store. It was designed to instruct the public in the proper use of electric light, but in concentrating upon this aspect of electrical application the organizers overlooked the presence of a small gas cooker slyly nestling in the corner of the " kitchen." Upon mentioning the point I was assured that the error would be corrected. After all, the gas industry is quite able to pay for its own publicity.

* * *

I had heard of various electric " animals " —horses (clothes horses), ponies (battery vehicles), etc.—but until a few days ago I hadn't come across an electric dog. The animal in question is specially designed to bark at burglars and other unwelcome visitors. It has the advantage of not requiring any feeding or exercise and I have no doubt could be made to bite if need be.

# T.U.C. Meeting

## *Productivity and Nationalization*

At one session of last week's meeting of the Trades Union Congress at Douglas, I.O.M., Mr. T. Hill (general secretary, United Society of Boilermakers, Shipbuilders and Structural Workers) introduced a motion expressing the opinion that the T.U.C. General Council members of the British Productivity Council, by agreeing to set up local productivity committees, had impinged upon the rights of affiliated organizations. It stated that productivity at local or workshop level was a question of wages and working conditions, and it therefore requested Congress to restrain T.U.C. members of the Productivity Council from further participation in the promotion and sponsoring of these committees.

Mr. Hill said that productivity was a question of work and wages, and therefore was not a prerogative of the General Council. His union had never objected to the principle of increased productivity, but productivity could not be imposed from above. Every change in production methods and every change in piecework prices was settled on the workshop floor.

Seconded by the Amalgamated Engineering Union, the motion was opposed by Sir William Lawther, National Union of Mineworkers, speaking as a delegate and not as a member of the General Council. This task was left to Sir Vincent Tewson, who said that the motion was an attempt to impeach nine members of the General Council who were members of the British Productivity Council. After some heated exchanges between Mr. Hill and Sir Vincent Tewson, the motion was lost.

### Operation of Industrial Disputes Order

Mr. George Elvin (Cinema and Allied Technicians' Union) moved a resolution requesting the General Council to call on the Minister of Labour and National Service to review the Industrial Disputes Order, in the light of the experience of its operation by affiliated unions and with due regard to previous Congress decisions. The General Council was requested particularly to seek amendment of the Order to prevent its use by an employers' federation to impose worsened conditions of employment and wage rates on workpeople who were already protected by other recognized agreements, and to intensify efforts to secure such a revision of the Order as was necessary to remedy the adverse effect on certain affiliated unions of the unsatisfactory manner in which the Minister interpreted Article 1 of the Order.

The motion was remitted to the General Council.

### Debate on Public Ownership

Mr. C. J. Geddes, C.B.E. (Union of Post Office Workers), opened a debate on the General Council's interim report on public ownership.

Speaking for the General Council, Mr. Geddes said that the planners of the 1950's had a more difficult task than the planners of the 1930's. In the latter period there were natural priorities for nationalization—coal, power and steel. To-day the situation was entirely different and more complex. The dollar gap had to be closed. They had not only to be sure of the method of nationalization, but also that the industries that were to be nationalized met the needs of the nation and the workers.

There was a substantial minority of opinion that nationalization was the panacea for all the evils with which they were faced. That was not his experience. Post Office workers were no better paid than anyone else. For 50 years there had been no improvement in their working hours. It was essential for the success of nationalization that the ordinary man and woman in industry should understand precisely what it meant.

Nationalization must not be used as a political catchpenny.

Mr. Bryn Roberts, general secretary, National Union of Public Employees, asserted that the report would become a "speaker's handbook for every Tory

candidate throughout the country." "If we adopt this report," he said, "we shall have two programmes in the next election. One by the Labour Party, 'We intend to do it,' and the other by the Trades Union Congress, 'It can't be done'."

On a card vote for the reference back of the report, there were 3,702,000 votes for the General Council and 2,640,000 against, but there were also 2,000,000 abstentions.

The motions on nationalization which followed aroused little interest. Victory had gone to the platform.

A motion of the National Union of Mineworkers, which condemned the present Government for denationalizing iron and steel and the road haulage industry, was carried.

A resolution by the National Union of Railwaymen which called for 50 per cent workers' representation in the management of nationalized industries was quickly disposed of and overwhelmingly defeated.

## E.T.U.—N.F.E.A. Dispute

### *Minister Appoints Court of Inquiry*

IT was announced last week that the Minister of Labour and National Service had decided to appoint an independent court of inquiry to investigate the causes and circumstances of the dispute between the Electrical Trades Union and the National Federated Electrical Association. This followed talks lasting twelve hours between officers of the Ministry and representatives of the Union and Association. A statement issued by the Ministry said that it was established that no mutually acceptable basis for a settlement existed. The Minister appealed to the employers to take no steps to aggravate the dispute and to the Union to call for a resumption of work. The N.F.E.A. agreed to co-operate in this if the E.T.U. would also do so.

The chairman of the court of inquiry is Mr. John Cameron, Q.C., Dean of the Faculty of Advocates, and the other members are Sir Graham Cunningham, chairman of the Triplex Safety Glass Co., Ltd., and Mr. G. B. Thorneycroft, who was until recently general secretary of the Transport Salaried Staffs' Association. The inquiry, which is being held in public, was to open yesterday (Thursday) at the Royal Courts of Justice, Queen's Bench Division, London.

On Monday Mr. W. C. Stevens, general secretary of the E.T.U., said that he had asked the Ministry for clarification on certain matters of principle and the Union would now arrange meetings of the strikers in all the areas affected. The men would be "strongly recommended" to resume work to allow the court of inquiry to meet in "an atmosphere of industrial serenity," but he thought that some might be reluctant to end the strike. He reiterated that the Union had made every possible attempt to get the dispute dealt with through the normal industrial negotiating machinery.

## Douglas Report

IN his report for 1952–53 Mr. C. Anderson, borough electrical engineer and manager of Douglas, I.O.M., states that the power station output increased by 3·05 per cent to 20·7 million kWh and sales to consumers by 5·57 per cent to 19·1 million kWh. This was made possible by the improved efficiency of transmission and distribution resulting from the change-over to a.c. The number of consumers rose from 8,772 to 9,159 and average consumption from 2,000 to 2,034 kWh, the figures per head of the population being 706 and 745 kWh, respectively. The average price obtained per kWh sold was 2·379d (against 2·432d). Although there was an increase in revenue of £13,180 and a reduction of £8,023 in operating costs of generation, distribution and management, the year's trading resulted in a deficit, which was limited to £17,562 by temporary suspension of part of the sinking fund payments. Factors responsible for this deficiency were the loss of the I.O.M. Electricity Board's contribution to interest, etc., charges on the power station plant, and the rise in fuel, labour and material costs (the average cost of fuel increased from £3 15s 4d to £4 3s 8d a ton).

## PRICES OF MATERIALS

IN the accompanying table we give the basis prices of the more important materials used in the electrical industry. The figures are those quoted on Monday last.

| | |
|---|---|
| ALUMINIUM Ingots .. .. | ton £150 0s 0d |
| COPPER, H.C. Electro .. .. | ton £229 0s 0d |
| Fire Refined 99·70 per cent .. | ton £228 0s 0d |
| Fire Refined 99·50 per cent .. | ton £227 0s 0d |
| COPPER Tubes .. .. .. | lb 2s 3¼d |
| Sheet .. .. .. | ton £286 0s 0d |
| H.C. wire and strip .. .. | ton £264 5s 0d |
| LEAD, English .. .. .. | ton £92 15s 0d |
| Foreign .. .. .. .. | ton £91 5s 0d |
| MERCURY .. .. .. .. | flask £64 15s 0d |
| TIN .. .. .. .. .. | ton £607 10s 0d |
| ZINC, G.O.B. Foreign .. .. | ton £66 0s 0d |
| Electrolytic .. .. .. | ton £67 5s 0d |
| BRASS Tubes .. .. .. | lb 1s 10d |
| Sheet .. .. .. .. | ton £230 5s 0d |
| Wire .. .. .. .. | lb 2s 5½d |
| PHOSPHOR BRONZE | |
| Wire .. .. .. .. | lb 3s 7½d |
| RUBBER, No. 1 R.S.S. spot .. | lb 19d–19½d |

# NEW BOOKS

**Television Engineering.** Vol. I. By S. W. Amos and D. C. Birkinshaw in collaboration with J. L. Bliss. Pp. 302; figs. 188; index. Published for *Wireless World* by Iliffe & Sons, Ltd., Dorset House, Stamford Street, London, S.E.1. Price 30s.

This is the first volume of a work on television engineering written by members of the B.B.C. Engineering Training Department, primarily for the instruction of the Corporation's own operating and maintenance staff. It provides a comprehensive survey of modern television principles and practice, on both the transmitting and receiving sides. The present volume discusses in detail the vision waveform derived from synchronizing and picture signals. Types of camera tubes in use by the B.B.C. and lenses are then described, and the final chapters are devoted to electron optics, involving a study of electric and magnetic lenses. The second volume, now in course of preparation, will cover vision-frequency amplifiers and waveform generation, and later volumes will deal with the remaining aspects of the subject. The technical level of the work has been devised to satisfy the student grade; mathematical argument has been excluded from the text, but appendices are included where special treatment of particular subjects has seemed desirable.

**Small Transformers and Inductors.** By K. A. Macfadyen. Pp. 237; figs. and index. Chapman & Hall, Ltd., 37, Essex Street, London, W.C.2. Price 37s 6d.

This book constitutes an admirable attempt to bridge the gulf which lies between conventional theory and the successful construction or application of a transformer. The author has done well by putting the reader in a position to deal with a wide variety of problems by a simple but fundamental approach which presents them all as particular cases of one basic problem which is solved in the earlier chapters, using equivalent circuits and simple algebra.

Another departure from convention is the inclusion of "synthetic" methods of design. The treatment of magnetic properties by the notation of complex permeability simplifies the whole subject, enabling the effects of permeability and loss upon performance to be accurately forecast. A useful feature of the book is the inclusion of reliable figures relating to laminations, wire and insulation.

Although it is assumed that the reader knows something about electricity and magnetism, the calculus and the a.c. notation, a brief account of the underlying circuit and field theory has been included. Altogether this is an excellent book.—R.P.

## Books Received

**Circuit Breaking.** Edited by H. Trencham. Pp. 206; figs. and index. Butterworths Scientific Publications, 88, Kingsway, London, W.C.2. Price 30s.

**D.C. Generators and Motors.** By J. E. Macfarlane. Pp. 99; figs. 38; index. Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2. Price 8s 6d.

**Introduction to Valves.** By R. W. Hallows and H. K. Milward. Pp. 152; figs. 106; index. Published for *Wireless World* by Iliffe & Sons, Ltd. Price 8s 6d.

**Boiler House Practice.** By J. N. Williams. Pp. 600; figs. 238; index. George Allen & Unwin, Ltd., Ruskin House, 40, Museum Street, London, W.C.1. Price 60s.

**Welding, Brazing and Metal Cutting.** Edited by E. Molloy. Pp. 192; figs. and index. George Newnes, Ltd., Tower House, Southampton Street, London, W.C.2. Price 15s.

**Principles of Electronics.** By H. Buckingham and E. M. Price. Pp. 335; figs. 266; index. Cleaver-Hume Press, Ltd., 42a, South Audley Street, London, W.1. Price 15s.

**Colour and Light at Work.** By R. F. Wilson. Pp. 148; figs. and index. Seven Oaks Press, Ltd., 165, Victoria Street, London, S.W.1. Price 25s.

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## Teneriffe Trolley-bus Plan

THE Canary Islands Council at Teneriffe proposes to change over to trolley-bus operation the tramway route, about 12 miles in length, inland from the port of Santa Cruz. It is understood that Spanish constructional firms have been consulted in anticipation of official approval of the scheme.

# PERSONAL and SOCIAL

## *News of Men and Women of the Industry*

AT a meeting of the Southern Electricity Consultative Council on 8th September, **Mr. A. Lockwood** (chairman) announced that he would be retiring on 30th September and that **Group Captain J. C. M. Hay** would succeed him as chairman.

**Mr. F. H. Page,** who has served with Henley's as a representative in the London area for over twenty-eight years, retires today (Friday). He is succeeded by **Mr. B. F. Green,** a member of the office staff of Henley's London branch, who joined the company in 1922.

**Mr. K. Ford,** A.M.I.E.E., A.M.Inst.F., deputy station superintendent at Chadderton L.P. station of the North Western Division, B.E.A., has been appointed deputy station superintendent at Chadderton H.P. station with effect from 1st October. Mr. Ford served his apprenticeship with the Metropolitan-Vickers Electrical Co., Ltd., and after a period with the North Eastern Electric Supply Co., joined the Nottingham Corporation in 1938. He went to the Ferrybridge station of the Yorkshire Electric Power Co. in 1946, and in the following year became charge engineer at Chadderton, and later was appointed efficiency engineer at both the Greenhill and Chadderton stations. He was appointed deputy station superintendent at Chadderton L.P. station in 1950.

**Mr. D. D. Shears,** mechanical maintenance engineer, Skelton Grange, has been appointed deputy power station superintendent at the Westwood power station of the Division with effect from 14th September. Mr. Shears served his apprenticeship with Horsham (Sussex) U.D.C. Electricity Department. From 1938 to 1940 he was at the Valley Road generating station, Bradford, and during the last war served with the Royal Navy (1940) to 1946), returning to Valley Road station where he was appointed shift charge engineer. He then became shift charge engineer at Skelton Grange, and in 1950 was appointed mechanical maintenance engineer there.

**Mr. R. A. Riddles,** C.B.E., M.I.Mech.E., M.I.Loco.E., who since October, 1947, has been the full-time member of the Railway Executive responsible for mechanical and electrical engineering, and who was formerly a vice-president of the L.M.S. Railway, is to retire from the railway service on 30th September.

**Mr. B. L. Perkins,** B.Sc.(Eng.), A.M.I.E.E., general sales manager, Foster Transformers, Ltd., left on 10th September for an extensive tour of East and South Africa on behalf of the Foster Co. and other companies in the Lancashire Dynamo group.

On 2nd September, in the conference room at St. Martin's Lane, the deputy chairman of the **London Electricity Board,** Mr. E. A. Mills, presented safe driving awards to thirty-five drivers in the Board's service for ten years or more of safe driving. Mr. John Rayment and Mr. Thomas E. Fennell, both of Northern Sub-Area, were awarded the twenty-five years' Cross.

The Brentwood and Romford Districts of the Eastern Electricity Board, Essex Sub-Area, have been merged to form the South-West Essex District, and **Mr. R. W. J. Benyon,** A.M.I.E.E., A.I.I.A., who was formerly manager of the Romford District, is now the manager of the South-West Essex District. **Mr. J. C. Horrell,** A.M.I.E.E., formerly manager of the Stevenage District, has been appointed to the position of manager, North Essex District, to fill the vacancy caused by the appointment of **Mr. S. F. C. Whitmore** as manager of the Chilterns Sub-Area.

**Mr. R. W. J. Benyon**

**Mr. J. C. Horrell**

**Mr. S. F. C. Whitmore**

**Mr. J. H. Cosens**, who has been Industrial Editor of the *Electrical Review* since 1938, has been appointed General Editor, and **Mr. P. W. Tucker**, M.I.E.E., Associate I.Mech.E., has been appointed to succeed the late Mr.

Mr. J. H. Cosens

Mr. P. W. Tucker

W. O. Fenwick as Technical Editor. Mr. Tucker joined the *Electrical Review* in 1925 as technical sub-editor and has been staff contributor for the past six years. He was previously with the Gillingham and Great Yarmouth municipal electricity undertakings.

**Mr. T. R. Porter**, M.B.E., has been appointed superintendent of the Control Department; **Mr. E. T. W. Barnes**, superintendent, Radio Department; and **Mr. A. J. R. Veale**, A.M.C.T., Graduate I.Mech.E., assistant superintendent, Radio Department, of the Metropolitan-Vickers Electrical Co. Ltd.

Mr. T. R. Porter has been superintendent, Control and Radio Department, since 1949. He joined Metropolitan-Vickers as a trade apprentice in 1920 and continued his technical studies at Bolton Technical College. Later he was given charge of the railway signal and train lighting production sections of the Traction Department. In 1934 he was appointed senior production engineer, and in 1936 he was given charge of production on the earliest defence contracts and continued as senior production engineer on searchlights and sound locators in the Gun Carriage Department until 1938. He was put in charge of radar production in 1938 and was appointed assistant superintendent, Transmitter Department, in April, 1944.

Mr. E. T. W. Barnes, after spending six years with the New South Wales Government Railways, became a college apprentice with the company in 1930. He entered the Meter Department in 1932 and has been engaged on the manufacturing side since then, including two years at Valpercy dispersal works during the war. He was appointed assistant superintendent, Instrument and Meter Department, in 1948. Mr. Barnes is an associate of the Sydney Technical College, an associate member of the Institution of Engineers (Australia) and an associate member of the Institution of Production Engineers.

Mr. A. J. R. Veale, who has been assistant superintendent Control and Radio Department, since 1949, was educated at Exeter School. He joined Metropolitan-Vickers as a school apprentice in 1937 and served in the mechanical departments until he was transferred to the Detail and Transmitter Department in 1941, where he was occupied on such work as the layout of works extensions and the development of radar and industrial and traction control.

**Miss June Oddy** has been appointed demonstrator in the English Electric Co.'s Domestic Appliance Division and will work from the company's London office.

**Mr. F. C. Serrao** has joined Oldham & Son (India), Ltd., in charge of the technical side of the company's Indian mining installations. Mr. Serrao was formerly with the Operations Department of Air India.

**Mr. T. R. Evans**, M.I.E.E., is retiring next month from the position of district commercial manager of District 346 of the South Wales Electricity Board, which comprises the areas of the Rhondda Valleys with that of the Ely Valley. Mr. Evans was apprenticed to Harry Parfitt, Ltd., in 1900, and received his electrical experience with the Glamorgan Colliery Co., Ltd. In 1908 he was appointed shift charge engineer to the Rhondda Transport Co., later being appointed chief assistant engineer to Mr. H. J. Nisbett, the company's first general manager. In 1914, Mr. Evans joined the Rhondda Council as chief assistant engineer to Mr. J. M. Bowman, the chief electrical engineer and manager, and served in this capacity for twenty-three years. In 1937 he became the Council's electrical engineer and manager.

Mr. T. R. Porter

Mr. E. T. W. Barnes

Mr. A. J. R. Veale

**Mr. B. Kellett,** late of the English Electric Co., Ltd., is joining Radio Heaters, Ltd., to whom he will act as a specialist induction heating sales engineer at the company's offices, 46, Gray's Inn Road, London, W.C.1. Mr. Kellett has had considerable experience in the induction heating field, having been with the Philips Electrical Co., Ltd., for many years before the war.

**Mr. J. M. Airlie** (Edinburgh), has been re-appointed chairman of the South East Scotland Electricity Consultative Council.

In last week's leading article it was stated that the team of specialists in fuel technology, which visited the United States last year, included no electrical engineer. We regret that this was inaccurate, as **Mr. J. H. Harris,** a member of the party, is a member of the I.E.E., holds an electrical engineering degree and has had some thirty years' practical experience in the manufacturing, public supply and industrial aspects of electrical engineering.

The fifth annual students' social evening of the **Telegraph Construction & Maintenance Co., Ltd.,** and **Submarine Cables, Ltd.,** was held at the Greenwich Town Hall on 4th September. Over 130 students and their friends attended, including the Telcon Education and Training Committee, and representatives of Johnson & Phillips, Ltd. The colleges were represented by Mr. H. A. Warren, the new principal of the South-East London Technical College, Mr. Fox, principal of the Greenwich, Woolwich and Lewisham Day Colleges, and Mr. H. V. Lowry, head of the mathematical section of the Woolwich Polytechnic.

Mr. Patterson, chairman-elect of the Telcon Committee, presided, and the principal guest was Sir Ronald Nesbitt Hawes, chief of educational administration of the English Electric Co., Ltd. Sir Ronald gave an address, and Dr. E. W. Smith, director of Telcon and Submarine Cables, Ltd., replied, after which he presented awards for examination successes during the past year. A cabaret followed the supper.

Fine weather favoured the official visit to Crawley, Sussex, of employees of the Metals Division of the **Telegraph Construction & Maintenance Co., Ltd.,** on 5th September, when 300 employees and their families went to see how the new metals factory on the industrial estate was progressing. A feature of the visit was a special display of electric cookers and heaters by B.N.E., the domestic appliance section of Johnson & Phillips, Ltd., in collaboration with the South Eastern Electricity Board.

At a contest held at Southport on Saturday last, organized by the Carnival Queen of Great Britain Association, **Miss Brenda Derby,** an employee in the Inspection Department of Rist's Wires & Cables, Ltd., was elected the first carnival queen of Great Britain. Miss Derby was also elected works queen in June this year.

The Horticultural Section of the Social and Athletic Club of the **Benjamin Electric, Ltd.,** held its annual show recently, Mr. L. R. Kavanagh, works director, performing the opening ceremony. The first prize was awarded to Mr. A. W. Croney for a vase of gladioli, and he also received an *Amateur Gardening* challenge cup, a bronze medal and the *Smallholder* blue ribbon.

## OBITUARY

**Mr. T. C. Wolley Dod.**—The death recently occurred in Pretoria, South Africa, of Mr. Thomas Crewe Wolley Dod, who played an important rôle in the establishment and development of electricity in Pretoria from its beginning about sixty years ago.

**The late Mr. T. C. Wolley Dod**

Mr. Wolley Dod was born in Cheshire eighty-four years ago; he received his technical training at King's College, London, and then joined Crompton & Co. as a pupil. When, in 1891, Cromptons secured a contract for erecting an electricity plant for the Pretoria Lighting Co., he was asked to go to Pretoria to erect the plant. After completing this work he returned to England, but had not been there for long when he accepted the appointment of manager of the Pretoria company in 1894. Mr. Dod managed the company until 1904, when it was taken over by the municipality, becoming the first municipal electrical engineer of Pretoria. Horse trams were replaced and Mr. Dod managed to make the tramways continue to pay their way.

Until 1928, when he reached retiring age, Mr. Dod was responsible for the lighting of the whole of Pretoria and the suburbs. When the Schoeman Street plant became inadequate, Mr. Dod advised the building of a power station at West End. He supervised the switch-over and the equipping of the new station. The council appointed him as one of its consulting engineers.

A motion of condolence was passed at a recent meeting of the City Council when the Mayor, Councillor E. Smit, spoke appreciatively of Mr. Dod's services to the city.

**Sir Harry Haward,** one of the original Electricity Commissioners, died on 8th September in his ninety-first year. He was appointed a Commissioner in 1920, and

retired from that position in 1930, although he continued to act for some time afterwards in an advisory capacity. Before joining the Electricity Commission he was Comptroller of the London County Council.

**Mr. Francis Patrick Irwin Crossley**, a director of Crossley Brothers, Ltd., died on 26th August. He was the grandson of, and heir to, Sir Kenneth I. Crossley (chairman), and joined the board in 1950.

## WILLS

**Mr. P. W. Laverick**, M.C., A.M.I.E.E., chairman and managing director of Line Equipment, Ltd., for many years associated with Electric Control (later Allen West, Ltd.) and a founder director of Switchgear & Equipment, Ltd., who died on 28th April last, left £11,256 gross (£10,147 net).

**Mr. T. W. Merry**, resident station engineer to St. Pancras Borough Council Electricity Department from 1927 to 1940, who died on 26th May last, left £2,373 gross (£2,306 net).

**Mr. H. M. Hibberd**, a director and works manager of Belling & Co., Ltd., who died on 26th June last, left £12,576 gross (£11,063 net).

## Brush Group Development

AT a luncheon to the technical Press last week Mr. Miles Beevor, managing director of the Brush Group, outlined the technical progress that had been made by the Group since he took over the managing directorship of the organization, but he stressed at the outset that much of what had been achieved was initiated before he assumed control, and that the Group was very conscious of its duty to build upon the foundations laid by its chief architect, the late Mr. Alan Good.

Dealing with the electrical side, Mr. Beevor said that during the years when the engine companies were being added to the Group, the chief function of the Loughborough factory was regarded as supplying the electrical needs of the engine factories, but the policy now was to place more emphasis upon the Loughborough products not necessarily directly related to engine sales, and to build up the electrical side as a trading entity that would support itself without having to rely upon the sales of generating plant secured by the engine companies. At Loughborough the Group had developed a range of main line locomotives, h.v. transformers of up to 150 kV, and h.v. circuit breakers, completed a new steam turbine test layout, established an insulation department and built a h.v. laboratory for use in conjunction with the development of transformers. At Cardiff the production of the "square path alternator" was proceeding with conspicuous success.

Mr. Beevor also announced that the Group was likely to receive orders valued at about £2,000,000 for marine engines for Russia. This was part of a possible order announced on 9th September for £10,000,000 worth of trawlers and other vessels from the Dowsett Engineering Group.

## Protective Relays

THE 1953 edition of B.S. 142, "Electrical Protective Relays," has just been published to replace the edition which was issued as a temporary measure in 1942 to meet urgent wartime needs. It has been revised and strengthened so that it more truly corresponds to modern knowledge, thereby contributing to a higher standard of performance. Among the many new features are the conversion of the recommended standard time-current characteristic for inverse-with-definite-minimum-time-lag relays to a mandatory standard, and a revision of the classification of instantaneous relays.

The Standard relates to relays intended for use in equipment designed for the protection of electrical plant against damage consequent upon abnormal conditions. It does not apply to relays for regulation or control purposes, or for use in starters and controllers, nor to direct-acting attachments to circuit breakers, such as under-voltage and over-current trip coils and the like. Electronic devices, which do not depend for their operation on moving mechanical parts and metallic contacts, are specifically excluded.

A comprehensive series of definitions of the terms used in connection with electrical protective relays is given and the various types are grouped according to their characteristics. The setting limits and temperature rise, with the appropriate limits of error, are also specified. Test requirements are stated and an appendix reviews recommended methods of measuring temperature.

Copies of the Standard are available from the British Standards Institution, 2, Park Street, London, W.1, price 6s.

## Television in Cornwall

ON 29th September the Minister of Housing and Local Government is holding an inquiry at Exeter to hear objections raised by the Dartmoor Preservation Society and others to the B.B.C.'s proposal to place its South-West transmitter on North Hessary Tor, Dartmoor. Metropolitan Distribution, Ltd., Truro, has taken the initiative in obtaining the support of the general public throughout Cornwall to help the B.B.C. substantiate its case. A letter has been sent to retailers and a letter of support for signature by members of the public is being circulated. The activity is sponsored by the Cornwall Federation of Chambers of Commerce.

# CORRESPONDENCE

*Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents.*

## Industrial Electronics

IN his article "Industrial Electronic Design: An Appeal for a New Approach," Mr. Bates (*Electrical Review*, 14th August) does all of us connected with this new branch of the industry a great disservice. Writing as a private individual and not in my official capacity as a technical writer in the Industrial Electronics Department of a large firm, I feel that Mr. Bates should not go uncorrected as he is fostering, quite wrongly, the very idea that is causing most sales resistance.

The first statement in the article: that electronic controls are unquestionably a most valuable aid to industry, and have been used with completely satisfactory results in many cases, none would deny, but the effect of such a statement is merely to "damn with faint praise" in view of the charge which follows: "However, one of the biggest problems a prospective user has to face is that of maintenance and repair." This is quite untrue. But it unfortunately perpetuates an electrical engineering fallacy that "electronics," "wireless," etc., is a box of unreliable bits and pieces redolent of the "fourteen-eighteen" war. How many radio sets work year in, year out without the back being unscrewed? The vast majority I maintain. My own set and those of all the members of my family have been going for six years (my mother's for sixteen) without attention, with the exception of two rectifier replacements. These are cheap, commercial products, with tolerances and margins cut to the bone, but basically the same components behaving in a very similar manner to those in, for instance, a motor controller or induction heater.

Many of the electronic controllers produced by my company have been working without servicing of any kind since they were installed—a period of over six years. Certainly none of the purchasers of these equipments could claim that he was facing a "big problem in maintenance and repair."

The article goes on to make several very useful and pertinent suggestions, the only fault being that they are without exception, already included in many equipments, certainly in my own company's, *where possible*. It is an unfortunate fact that things like metering and plug-in units have to be paid for, and if a customer insists on an equipment without "frills" at rockbottom price, then, however sad and undesirable, such things must be considered otiose. For those customers who are prepared to pay "the little extra," metering, or points at which a meter can be "tapped on," spare interchangeable units, and instruction books complete with functional diagrams and circuit diagrams, put maintenance of the whole outfit within the capabilities of any reasonably intelligent electrician.

On the point of an industrial oscilloscope, I agree whole-heartedly. I am sure one could be produced and would find a ready market, but surely it is a bit hard to blame industrial electronics for the lack of one?

*Talke,* R. E. NEWLING.
*Stoke-on-Trent.*

## Are Qualifications Necessary?

THERE is no doubt at all that most employers will accept a man who can produce qualifications in preference to one without, and that in most cases the latter will not be considered though he may be more suitable. This means that the majority of men entering the "higher realms" of the electrical engineering industry are young men with a good technical education but very little practical experience.

In the industry to-day there are many experienced men who spend a considerable amount of their spare time in home study in the hope of improving their position, a hope that has very little chance of being

realized, as many of them are employed by small firms which do not offer much opportunity. They may attain a high standard of technical education, but they can never obtain the necessary qualifications as they can spare neither time nor money in attending a technical institute, especially in rural and provincial areas—this area for example, where the nearest suitable institute is a considerable distance away.

I think that the industry would benefit considerably if a special examination could be arranged for these men. If laboratory experience is as essential as many people seem to think, a laboratory course could be introduced which could cover the work carried out in the normal course, thus cutting the time of attendance at a technical institutes from years to a few weeks.

*Ramsgate.* W. BANNING.

## Lamps for Street Lighting

DURING the past month I have been dallying in those parts of Scotland where neither the Hydro-Electric Board nor the *Electrical Review* has penetrated, and consequently it is only upon my return that I have become aware of the continued interest in light sources which my article appears to have engendered.

Picking up the threads where I dropped them, I see that Mr. McCauley writes in favour of both the fluorescent and the h.p.m.v. lamps and states that the 400 W h.p.m.v. can hold its own with the 140 W sodium. Using the same basis of calculation as I used previously, I find that at the average cost of 1¼d/kWh, energy (including choke losses) would amount to £8 18s 0d, with lamp renewals costing £2 19s 0d, a total of £11 17s 0d. The figure for sodium is £7 15s 0d. Lumen outputs are 13,600 and 8,960 respectively. The resulting prices per lumen are almost equal, being 0·209d for h.p.m.v. and 0·207d in the case of sodium. However, the small advantage in favour of sodium should tilt the finely held scales.

Mr. McCauley's interest in the h.p.m.v. lamp is understandable since the firm with which he is associated can claim to have done more to develop this type than any other. I think, however, that it will ultimately be essentially an industrial lamp.

Mr. Garth appears to have come down on my side in whole-hearted fashion, and I have no comment to make with regard to his contribution to the controversy.

"Pro Bono Publico" is in favour of fluorescent lighting, and cites many instances where the Ministry of Transport has contributed to the provision of such lamps on trunk roads. I must admit to being sceptical regarding this statement and think that it is only in isolated and special circumstances that the Ministry has approved the installation of fluorescent lamps, certainly not on trunk roads *per se*, and it is the lighting of trunk roads we are discussing. I am aware, of course, of the existence of considerable stretches of fluorescent lighting on the Continent, and Mr. Boereboom's paper at the A.P.L.E. Conference adds to this knowledge. On the information he imparts concerning one large undertaking covering 357 towns it is seen that the number of h.p.m.v. lamps practically doubled, whilst fluorescent lamps increased by 40 per cent. These figures, whilst encouraging to the advocates of fluorescent hardly support the impression of a wholesale changeover to fluorescent that "Pro Bono Publico's" letter gives, especially when the sales of fittings are in the ratio of 70 : 20 : 10 for h.p.m.v., fluorescent and sodium. In parenthesis, I would admit to surprise at the small amount of sodium.

Mr. Staniforth advances some excellent arguments regarding the provision of high level illumination by means of 400 W h.p.m.v. lamps, and I hope I shall not be thought inconsistent if I say that I agree with what he says. I would repeat, however, that it is the lighting of trunk roads we are considering, and for the lighting of these roads I am of the opinion, substantiated by practical experience of many miles of such lighting, that the 140 W sodium is more than adequate, the proof being that it is the general practice of all users of these roads to extinguish their headlamps. It is only in town centres that a greater amount of light is desirable, and then I would rather make use of fluorescent than h.p.m.v., since the colour factor assumes importance because of the large amount of pedestrian traffic.

Mr. Robinson returns to the lists in favour of fluorescent lighting. I should be only too pleased to advance the undoubted merits of this system, but I remain convinced that sodium offers the most economical solution for the lighting of our roads.

Mr. Hill purports to show that fluorescent lighting is the cheapest form of lighting,

but conveniently omits to take into account capital costs, as he does maintenance charges, which are greater for the fluorescent lamp. The cost of a two-tube lantern and heavier section column (including erection) is well over £30 more than the 140 W sodium. Taking a 20-year loan period, and interest at 3½ per cent, the annual repayment for this amount is £2 4s 0d. The apparent saving of £1 1s 7d shown by Mr. Hill is thus in reality an increase of £1 2s 5d. In addition there are higher maintenance charges, while on his own showing the light output is inferior, albeit of a pleasing colour. Although not deprecating the idea of cheaper fittings in a nebulous future, I consider it the duty of engineers to deal with facts.

Finally, "Pro Bono Publico" casts doubts upon the validity of Mr. Hill's figures, but at the same time supports him in his plea for consideration to be given to the fluorescent lamp.

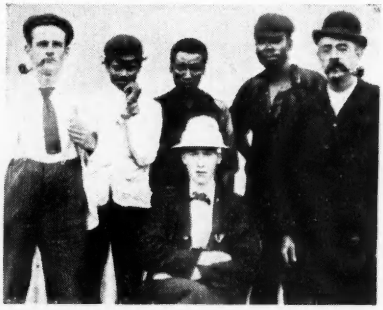
In viewing the correspondence as a whole it appears that some confusion is caused by street lighting being considered as being the same as trunk road lighting. I specifically exclude town centres, where I feel the fluorescent lamp (but not the h.p.m.v.) has an assured future, from my assessment; and I think that it must be agreed that, for the lighting of trunk roads, sodium lamps are pre-eminent, both economically and from the drivers' point of view.

*Pentyrch, Glam.* F. H. PULVERMACHER, A.M.I.E.E.

### "Those Early Stations"

IN case it may interest you, I enclose a photograph of the whole staff of the Durban (South Africa) Electric Light Works in 1896; the youth in the chair is—or was—myself. This was before John Roberts was city electrical engineer of Durban.

**The staff of the Durban electricity works in 1896**



Some years before then I was chief assistant engineer at the Electric Light Works, Salford, Manchester, for a year or so. The chief was Mr. Turner, who was the manager of the Gas Works.

H. CLEMENT NEWTON, M.I.E.E., M.I.E. Aust.

*Melbourne, Vic., Australia.*

## Contract Price Formulæ

THE British Electrical and Allied Manufacturers' Association has issued the figures for its contract price adjustment formulæ. In each case the rate of pay for adult male labour at 12th September is deemed to be 141s 6d. The "cost of material" figures are as follows:—

For electrical machinery and equipment: the Board of Trade index figure published on 12th September is 149·7.

For turbo-generating and allied plant: materials used in mechanical engineering industries, 143·2; blast furnaces and iron and steel smelting and rolling (40 and 41), 144·3; price of ⅜in o/d 18 s.w.g. brass condenser tubes (*Metal Bulletin*, 11th September), 3s 6¾d per lb.

Outstanding contracts covered by the Board of Trade intermediate products index: the index figure for intermediate products (12th September) is 354·9.

## Water Power in Hungary

THE Tisza hydro-electric and irrigation project now under construction in Hungary will transform the arid north-eastern plain.

At Tiszalök a dam 90ft high has been built in the area enclosed by a double bend of the river, which will later be diverted to a new channel at that point. A system of locks will lift 1,000 ton ships above the dam, and they will be able to steam on up the Tisza and its tributary, the Bodrog, as far as the north-eastern frontiers. Work on this part of the lock system is now finished. Another lock will give access to a ship canal running due south from the dam 60 miles to the River Berettyó. The first 40 miles of this canal will be brought into use with the power station, next May. The canal has two uses; not only will it provide for heavy transport by water, but it will serve as the basis of a vast irrigation system over an area of some 1,300 square miles. For irrigation, experiments are being carried out with large sprinklers suspended from balloons. Power will be supplied to hundreds of towns and villages and help forward the Government's plans for industrial development in the north-east.

# British Association

## *Further Papers and Discussions at This Year's Meeting*

TWO papers in Section A (Mathematics and Physics) on the generation of electricity in thunder clouds and its discharge were presented to the British Association for the Advancement of Science at Liverpool on 3rd September. (A report of the opening proceedings appeared in our last issue.)

Professor J. M. Meek referred to recent improved techniques in the recording of high-speed phenomena which had resulted in rapid progress in knowledge of the electrical characteristics and manner of the development of the discharge; understanding of the physical processes involved, however, was still incomplete.

In 1933 Professor B. F. J. Schonland showed by photographs, taken in South Africa with a Boys camera, that a series of multiple strokes, each consisting of a series of discharge processes, followed the leader and the return stroke. The first stroke of the discharge was initiated by a stepped leader stroke which developed from cloud towards ground at about 20 million cm/sec. The luminosity of the track showed sudden increases in brightness at intervals of about 50 millionths of a second, giving a stepped appearance.

The return stroke from ground occurred along the ionized path traced by the leader, and its speed was about 2,000 million cm/sec (approximately one-tenth the speed of light) and the current flowing was many times higher.

After an interval, of about 0·03 sec, a second stroke might occur, preceded by a "dart leader," from cloud to ground along the same path at a speed ten times greater than that of the initial stepped leader. The dart leader was followed by a return stroke. Other such strokes might follow at similar intervals. Branching of the discharge was observed only in the first stroke of the series.

Discharges to high buildings differed from those to open country and had been initiated at an earthed building as a stepped leader stroke which developed upwards to the cloud, corresponding in speed and manner of growth to that of the stepped leader stroke for the discharge to open country, but without subsequent return stroke, though the luminosity and current persisted as a "continuing stroke." Later strokes operated in the same manner as that for discharges to open country.

Investigations on sparks in the Electrical Engineering Department of Liverpool University with a one million volt impulse-voltage generator and a half-million ampere impulse-current generator were partly concerned with photographic and photoelectric measurements of the growth of sparks across a gap.

Mr. B. J. Mason, of the Department of Meteorology at Imperial College, London, proposed a new theory of generation of electricity in thunder clouds, which could be regarded as electrostatic generators producing electrical charges, both positive and negative.

The electric field between the charge regions, or between one of them and the earth, grew until electrical breakdown of the air occurred, producing a conducting channel along which part of the originally separated charge disappeared.

Exploration with aircraft and radar showed that a thunderstorm consisted of one or more localized regions or cells, which contained strong vertical air currents and were the locale of raindrop and hailstone formation and of lightning activity.

Whilst the whole life of a cell might occupy about an hour, the mature stage during which precipitation was released and the lightning occurred lasted about 15 to 20 minutes.

Thunderstorm electrification was associated with the growth of ice pellets in the sub-freezing region of the cloud.

### Age of the Earth

The presidential address to Section A (Mathematics and Physics), entitled "Half a Century of Geophysics," was delivered on 4th September by Professor Sir Harold Jeffreys. He expressed doubt as to whether

the age of the earth was much over 2,000 million years or known within 500 million years; the discovery about 1900 of radioactivity had outdated estimates derived from the rate of cooling of the earth. The old view that the earth was fluid apart from a solid crust was based on the theory that if the rate of temperature increase near the surface persisted, melting temperatures would be reached at a depth of 50 km, although there would then have been no oceanic tides. Actually the rate of increase was mostly maintained by radioactivity in the upper 15 km (otherwise the outflow of heat would be too large), below which the temperature gradient was much less. Deep-focus earthquakes indicated that the earth was solid to a depth of at least a tenth of its radius.

Terrestrial magnetism was formerly considered in relation to the atmosphere and solar effects, but the hypothesis that changes in the earth's magnetic field are due to electric currents in the liquid core was being investigated; a rapid increase in electrical conductivity at 400 km had been indicated. Temperature distribution presented the most doubtful aspect, and temperatures at the core boundary of from 2,000 to 5,000 deg C had been estimated.

A discussion on the magnetic properties of the earth's interior was opened by Sir Edward Bullard on 4th September. He described the observed features of the earth's magnetic field and reviewed possible explanations.

Professor A. T. Price, in an address on periodic and irregular fluctuations of the earth's magnetic field, said that both the periodic daily variations and the non-periodic changes, which occurred during magnetic storms, arose primarily from electric currents flowing in the ionosphere, the changing magnetic fields inducing further currents within the earth, the study of which indicated the electrical conductivity of the earth at various depths.

## District Heating

On 7th September, Mr. A. E. Margolis presented a paper on district heating, with which he has been concerned for many years.

In the Hamburg scheme, which he had instituted in 1921, three old condensing stations had been converted for district heating with the heat distribution system connected to a comparatively modern power station. In spite of severe damage by air raids and fuel shortage, the heat output, including that of a new heat-electric station, rose last year to 34 million therms, when new load amounted to 80,000,000 B.Th.U./hr—approximately the total load of the Pimlico undertaking in London when fully developed.

About half the final heating load of the Pimlico scheme was now in operation. Its main feature was a hot water accumulator for balancing the variable requirements of electricity generation and heat supply.

The heat storage capacity of the accumulator was about 5,000 B.Th.U./cu ft—only 5 per cent of that required for the equivalent town gas storage. Its annual heat losses were less than 1 per cent of the annual heat consumption and capital cost did not exceed that of cooling towers of condensing stations.

Hot water could probably be supplied economically at a distance of six or perhaps even ten miles.

## Building Heating Efficiency

Mr. A. T. Pickles, O.B.E., discussing researches on the heating of buildings carried out by the Building Research Station since 1946, said that most of the known facts concerning the efficient use of fuel were given in the report of the Ridley Committee.

Work was carried out in 44 small houses built at Abbots Langley, Herts, and extended to schools and factories, and an experimental assessment of the efficiency of a small district heating plant for houses was made. The essential condition was normal occupation of the buildings.

The temperature in each room of the houses was recorded day and night for over four years in some instances, a system of multicore cables connecting the thermometers to central recording stations. The ventilation rate was measured from outside the houses by the use of helium as a tracer gas and thermal conductivity bridges. The researches had led to the rehabilitation of the open fire, in an improved version and fitted with a back boiler. A new primary school near the station was designed to have two classrooms heated by forced warm air, two by floor heating and two by conventional radiators. Since schools were occupied for only about 20 per cent of the time, substantial economy was obtained through the flexibility of warm air heating.

## Calculating Machines

In an address dealing with calculating machines Professor L. Rosenhead pointed out that such electronic devices only embodied the refinement and elaboration of known techniques. Most modern machines were digital and operated on discrete objects which represented numbers; they were fully automatic, calling for no human intervention, after formulation of the initial instructions; they made calculations with a speed and reliability quite impossible to human computers, but the criteria had to be thought out by the operators and embodied in the machines.

Pure science provided the ideas, but development was mainly due to private commercial enterprise and the fighting services, about 125 years after an Englishman, Babbage, had laid down almost all the scientific and engineering principles involved.

Simpler and less expensive machines were likely to be created in the future with a growing use of numerical analysis, as distinct from mathematical analysis, in the solution of problems of pure and applied science. They permitted the solution of many problems hitherto considered impossible on account of the difficulty of the purely mathematical approach, or on account of the excessive human labour involved in numerical solutions.

## Transmutation of Elements

Dr. R. Hurst, G.M., dealing with the transmutation of elements in atomic piles, before the Chemistry Section, said that artificial transmutation of elements had become possible only within the last 20 years, originally by bombardment by high energy particles, accelerated in electrical machines, as was done by Cockcroft and Walton. The amounts transmuted were infinitesimal and detectable only by radiochemistry. Transmutation of weighable amounts had to await the invention of the nuclear reactor, in which the transmutation desired was that of uranium to plutonium, but other transuranic elements were formed by secondary reactions which gave smaller amounts of neptunium, americium and curium. Those elements were purely synthetic but did not differ from natural elements. The regular structure of the periodic table of inorganic chemicals appeared to break down in the heaviest elements. All transuranic elements were radioactive and the regularities of their decay properties showed that several elements beyond the last at present known (californium, element 98) might be discovered, although their short half-lives (probably only hours) would entail very quick chemical separation and identification.

If, in another decade, a large fraction of our power was produced from atomic fission, the hundreds of grams of neptunium and americium and grams of curium thus made available might have practical uses also.

The formation of transuranic elements was accompanied by another kind of transmutation—the fission of the U235 atoms into fragments, which included over 30 elements. Only two were not known as natural elements—technetium (element 43) and promethium (element 61)—and were now being separated in gram quantities for chemical study.

Dr. K. F. Chackett discussed before Section B the utility of particle accelerators in the production of radio-elements of interest to chemists. He also referred to recent research with the Birmingham University cyclotron.

## Nuclear Research

Nuclear physics research at Liverpool University was discussed by Professor H. W. B. Skinner. Following the work of Rutherford, he said, machines had been built for obtaining increases both in energy and in intensity. Two important problems were now the detailed elucidation of the properties of the various nuclear species and the investigation of the new unstable particles (mesons) which had been found by means of cosmic rays. The first required machines accelerating particles (electrons, protons, deuterons) up to energies of 1 to 20 million electron volts; the second required energies of more than 200 million electron volts.

The two basic kinds of machine were (a) those in which the high voltage was actually produced for the acceleration of the particles (the high tension generator of van der Graaff), and (b) those in which the particles were accelerated by successive applications of a smaller voltage. The latter might be divided into machines using a magnetic field to coil up the particle track (cyclotrons, synchrotrons) and machines which did not use a magnetic

field (linear accelerators). The problems also tended to be different according to the particles (e.g., electrons, protons, or deuterons) to be accelerated. Machines of type (a) produced energy which, with existing techniques, was in the region of 10 million electron volts. Machines of type (b) had no such limitation, but were of lower intensity and less accurate energy regulation.

Most had so far been done with machines of type (a) and with cyclotrons to accelerate heavy particles, or synchrotrons and linear accelerators for electrons. The large synchro-cyclotron now nearly completed at Liverpool University would produce protons of 400 million electron volts energy, and increase the energy of the particles into the region where the relativistic charge of mass with energy was significant.

One session of Section G was devoted to the consideration of papers by young engineers.

Dr. J. E. Parton and Dr. W. D. Sutherland presented a paper summarizing single-phase combined magnetization conditions with special reference to integrally related two-frequency magnetization.

Several formulæ (mostly empirical) were available to compute iron losses in magnetic circuits of single-frequency magnetization, for various values of magnetizing force and flux density. The magnetization was usually considered as taking place under sine-flux or sine-current conditions. The former was the standard test method, because when a sine voltage was applied to a winding on a magnetic material the resulting core flux would be sinusoidal, if the winding, as was usual, had negligible resistance and leakage reactance. The difficulty of obtaining sine-current sources usually restricted the application of the second method.

Where the iron circuit was subjected to simultaneous magnetization from two sources, the frequencies of which might not be integrally related, the resulting iron loss in the magnetic material could not be predicted from single-frequency results. The authors considered in detail the nature of some of the multi-frequency magnetization conditions and the resulting iron losses, concerning which there is little literature.

Mr. K. L. Morphew discussed the uses of calorimetry in engineering, with emphasis on the applications of autocalorimetry to magnetic iron loss testing. In the calorimetric method in general use the heat produced from the alternating magnetization of an iron specimen was shared by all parts of the calorimeter and its fluid surround. In researches at Southampton University into the thermal properties of electric sheet steels, a method of measuring the specific heat, which was an unknown, was being developed in which the specimen did not thus share its heat.

Practical advantages were the absence of a liquid bath with the necessary elaborate stirring arrangement, the short measurement time, and the independence of temperature measurement from flux and magnetizing current, so that it could be made with a single pulse or repeated pulse or any non-sinusoidal wave-form, with either reversible or incremental magnetization.

Mr. R. Yorke showed how many vibrating mechanical systems could be solved in terms of analogous electrical circuits theoretically or from experiments set up with electrical apparatus, inasmuch as the equations describing them were identical in form.

A detailed analysis was given of the vibrations occurring in the gramophone pick-up, using the equivalent electric system as an analogue analyser.

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## Belfast Boiler Contract

THE Belfast Corporation Electricity Committee met on Friday last and decided that in placing with Babcock & Wilcox, Ltd., the £2,976,469 contract for boiler equipment for the Victoria power station—which was recently the subject of a High Court action—special considerations existed authorizing it to do so. A special meeting of the City Council was to be held this week to consider the Committee's decision. The Committee was to ask the Council to place all orders which it had already recommended, emphasizing that it was urgent that orders for plant and equipment should be placed at the earliest possible moment.

Letters protesting against the acceptance of the tender were tabled during the meeting from the Chamber of Commerce, the Chamber of Trade, the National Union of Small Shopkeepers, and the Christian Endeavour Citizenship Union.

The Committee, in affirming its previous decision against advertising publicly for the contracts, had taken cognizance of a further report received from their consulting engineers which stated it was essential that orders for the plant should be placed as soon as possible if there was to be any hope of its being installed and in operation by 1956-57.

# RECENT INTRODUCTIONS

*Notes on New Electrical and Allied Products*

## Colour-Corrected Lamps

A NEW range of " Osram " colour-corrected mercury vapour discharge lamps with 80 W and 125 W ratings is available from the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2. They employ a newly developed fluorescent powder and their colour appearance and colour rendering properties show a big improvement over their predecessors. The powder has a white body colour and provides an increased red ratio of 7 per cent. Its improved temperature stability has enabled the outer bulbs to be reduced in size to that of standard mercury lamps of the same rating.

The 125 W lamp is available with either a g.e.s. or three-pin bayonet cap; the 80 W lamp has a three-pin bayonet cap. The list prices of both lamps have not changed from £2 8s 6d for the 80 W and £2 19s 0d for the 125 W size.

## Diesel Engine Protection

Two protective equipments for diesel engines, one electrically operated and the other mechanically, have been put on the market by TEDDINGTON INDUSTRIAL EQUIPMENT, LTD., Sunbury-on-Thames, Middlesex. In the case of the electrical unit, control is normally provided for lubricating oil pressure and cooling water temperature. The cooling water temperature instrument is provided with armoured capillary tubing and a suitable insertion bulb with pocket screwed ½in B.S.P.

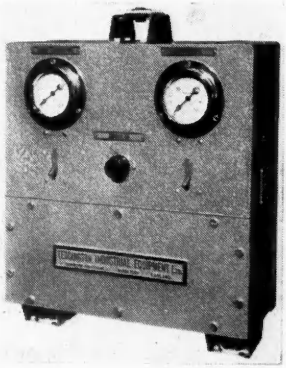
This panel is suitable for mains or battery supply and with small automatically started generating sets it will allow up to one minute delay after energizing before the oil pressure control is put into circuit. Assuming a 20 sec starting cycle this will give three starts, and if by that time the oil pressure is not established the appropriate fault indicator will be energized and the engine stopped. Similarly, if during normal running the oil pressure falls below the predetermined minimum figure or the cooling water temperature rises above the predetermined maximum figure, a circuit will be energized to shut down the engine and the fault indicator will show the cause of the trouble.

## Rotary Cleaning Spindle

The " Feco " electric rotary cleaning spindle made by the FARNWORTH ENGINEERING CO., LTD., Emlyn Street, Farnworth, Lancs, provides an efficient means of clearing deposits of " fly " from moving textile machinery without risk of injury to the operator.

The unit is on a four-wheeled trolley and is operated by two 6 V 130 Ah " Exide " batteries arranged side by side on the base. A 12 V motor between the handles drives a ball-bearing mounted head through a flexible shaft. Coupled to the head is a flexible armoured cable carrying the drive to the tube enclosing the tapered cleaning spindle running on twin sets of ball bearings.

**Teddington oil engine protective equipment**

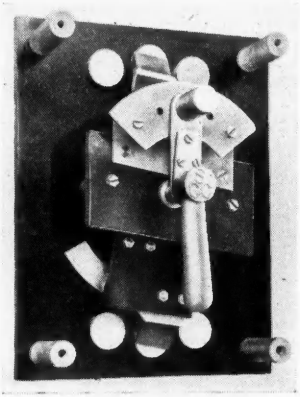


**" Feco " electric rotary cleaning spindle**

The small weight and slender design of the spindle enables it to be used with one hand, leaving the other free to remove the collected "fly." The control switch, working in conjunction with a red pilot light that shows when the machine is running, is mounted at the top of the motor base plate.

## Heavy Current Switches

The D series switches made by the TIME SWITCH & CONTROL Co., Vale Road, Watford, Herts, are intended for l.v. working with currents from 250 A to 1,000 A. For meeting the demand for multi-pole switches having only a few positions the D series switch is normally ganged to produce the required unit. To save space and reduce costs a two-pole switch designated type DD is now available. The illustration shows a typical three-position two-pole switch fitted with a B type lock; this particular switch operates at 250 A and 400 V. The DD switch is also available with a P type control which has a combined mechanical and electrical interlock.



**Type DD two-pole heavy current switch**

## Die Grinder Kit

A die grinder kit (type DG1) recently introduced by WOLF ELECTRIC TOOLS, LTD., Hanger Lane, Ealing, London, W.3, is able to grind wheels up to 1⅛in in diameter by $\frac{5}{16}$in and has a speed (running light) of 16,000 r.p.m. The input on full load is 270 W and the weight is 5 lb. Although it is primarily a portable tool, it can be mounted in a bench clamp stand for stationary use.

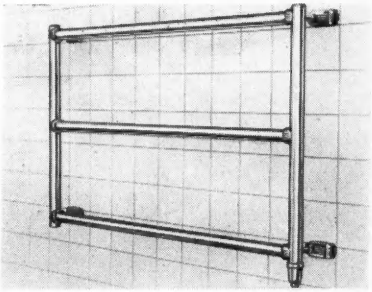
High tensile aluminium alloy is used for the motor frame which is attractively finished in polychromatic stove enamel. Dust sealed ball bearings are used throughout and the double-pole switch is fitted with a retaining button.

The complete kit comprises the grinder with 10ft of three-core t.r.s. cable, a spare set of carbon brushes, a set of mounted points, grinding wheels, and felt bobs and arbors, all housed in a steel carrying case. A wider selection of rotary files and milling cutters for use on non-ferrous metals is available to suit special requirements.

**Wolf die grinder kit**

## Towel Rails

An electric towel rail suitable for both wall and floor fitting is now available from HURSEAL, LTD., 229, Regent Street, London, W.1. The "Hurseal-Leda" electric towel rail employs the patented "Hurseal" oil circulation system and it is claimed that this eliminates any danger of scorching or burning as is sometimes possible with the dry element type of airer. Both the 3-rail floor models and the 3-rail wall models are obtainable in two sizes with respective loadings of 120 W and 130 W. Prices of the four models range from £19 19s 6d plus £11 13s 8d purchase tax in the United Kingdom to £22 19s 6d plus £13 8s 10d purchase tax.



**"Hurseal-Leda" wall mounting towel rail**

# COMMERCE and INDUSTRY

## Fuel Efficiency Exhibition

## Australian Import Restrictions Relaxed

THE National Fuel Efficiency Exhibition, under the auspices of the Combustion Engineering Association, will be held at the City Hall, Deansgate, Manchester, from 18th to 28th November. The exhibition will be opened by Lord Derby, and during the run of the exhibition the C.E.A. will hold a two-day meeting at the Grand Hotel. Special exhibits will include "Power and the Future," provided by the British Electricity Authority, showing examples of wind and tidal power, gas turbines, cross-Channel power transmission, and atomic power (arranged in co-operation with the Ministry of Supply).

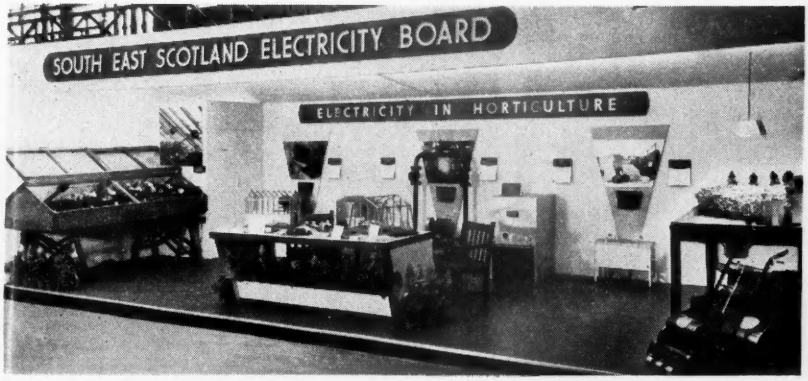
### Electricity in Horticulture

The Countess of Dalkeith opened the Royal Caledonian Horticultural Society's Autumn Show which was held in Edinburgh from 2nd to 4th September. The record attendance reflected the increasing success of Scotland's premier horticultural show. In the forefront of the trade exhibits was the display of the South East Scotland Electricity Board where the latest applications of electricity were demonstrated. Of special interest to both amateur gardeners and commercial growers was the self-contained propagating case. This consisted of a miniature glasshouse on a propagating bench. The case had its own thermostatically controlled air heating equipment and the requisite root temperature was maintained by a separate soil warming cable. In addition, the forced draught fan unit and hot water circulator displayed emphasized the part electricity is playing in ensuring the efficient operation of the more traditional means of space heating in commercial glasshouses.

### First 66 kV Cable in Africa

Two years after supplying and installing 33 kV cables between Salt River power station, Cape Town, and two new substations at Oakdale and Elsies River, British Insulated Cables (South Africa), Ltd., an associate company of the B.I.C.C. Group, has been awarded an extension to the contract, involving the use of the first 66 kV cables, which will also be the first of the impregnated pressure type to be used in the continent; they will carry a further 43 MVA per feeder between Salt River and Oakdale. The original contract involved the laying of three 33 kV three-core solid type cables between Salt River power station and the new Oakdale substation at Bellville, and two similar cables to the new substation at Elsies River. Over 60 miles of 33 kV cable were used together with 68 miles of pilot and

**The South East Scotland Electricity Board's stand at the Royal Caledonian Horticultural Society's Show**



control cable. The establishment of the two substations, and their local and rural distribution networks, was designed to meet the increasing loads placed on the Cape Western undertaking of the Electricity Supply Commission of South Africa. Two 66 kV cables will be laid between Salt River power station and Oakdale substation, a distance of approximately 11 miles, and a further 33 kV cable between the power station and Elsies River, about seven miles away.

## Census of Production

The scope of the census of production to be taken in 1955 in respect of the year 1954 and the information to be obtained have now been considered by the Census of Production Advisory Committee. It had been decided that all establishments within the field of production will be included in the census, which will be on similar lines to the full census for 1951. Trades covered will be the same as those included in the censuses for 1951, 1952 and 1953; that is to say, manufacturing, mining, building and contracting and public utilities will be covered. Details of the output and materials headings which are to be specified for 1954 will be sent for comments to the trade associations concerned as soon as possible. Any firm in the field of production requiring further particulars about the census for 1954 should address its inquiries to the Census of Production Office, Neville House, Page Street, London, S.W.1, stating the nature of the business carried on.

## Broadcasting Guide

The seventh edition of the "Guide to Broadcasting Stations" compiled by the staff of *Wireless World* has just been published by Iliffe & Sons, Ltd., Dorset House, Stamford Street, London, S.E.1, price 2s. This useful little book provides data (corrected to 1st August, 1953) on the world's broadcasting stations. It lists first in order of frequency and then geographically all the European long- and medium-wave stations, and over 1,600 short-wave broadcasting transmitters working on a power of over 1 kW throughout the world.

## "Lighting to Measure"

A miniature Ideal Home Exhibition (ideal from the lighting aspect) was opened at Heal's Mansard Gallery, 196, Tottenham Court Road, London, W.C.1, on 8th September; it is to remain open until 24th October. The exhibition comprises a suite of rooms, appropriately furnished, in which ceiling lighting fittings and floor and table standards are placed in the positions which are considered the best for securing the maximum light and most comfortable results for various purposes. In every case the mounting height and spacing of the fittings are indicated by tape measures; e.g., for ceiling fittings a height of not less than 84in is indicated.

A booklet produced in connection with the exhibition illustrates various rooms and employs the tape-measure method of placing the fittings. In addition advice is given on the wattages of lamps to be used in rooms of various sizes and the illumination of halls, landings, entrances, etc., is dealt with.

The exhibition was opened by Dame Caroline Haslett, director of the Electrical Association for Women and chairman of the E.D.A. Council.

## Electrical Commercial Travellers

The annual dinner, Coronation ball and cabaret of the Electrical Trades' Commercial Travellers' Association will be held at the Café Royal, Regent Street, London, W.1, on 22nd October. Tickets (35s each) can be obtained from the hon. social secretary, Mr. H. Bowen, 37, Penywern Road, London, S.W.5.

## House of Commons Lighting

Referring to a recent note in the *Electrical Review* mentioning the lighting in the House of Commons, Falk, Stadelmann & Co., Ltd., ask us to say that Mr. B. Ansell was invited by Sir Giles Gilbert Scott and Messrs. Oscar Faber & Partners, in the spring of 1946, to act as consultant in matters of fittings design and he remained in that capacity until the opening of the House of Commons. Mr. Ansell is managing director of Smith & Ansell, Ltd., a subsidiary of Falk, Stadelmann & Co.

## Australian Import Relaxation

Mr. Menzies, the Australian Prime Minister, announced on 11th September that a further 10 per cent relaxation of the import restrictions which were imposed in March, 1952, will be effective from 1st October. This will allow an additional £A45 million of goods into Australia in a year. Of the original restrictions 30 per cent have now been relaxed. The new proposals will allow an extensive list of essential items at present admitted under administrative control to be licensed without restriction where the goods can be imported within a year. These include a wide range of machinery and tools, and scientific instruments. Dollar countries are excluded from the relaxation and Japan will receive special treatment, permits for imports from that country being increased in line with the increase in imports from other non-dollar countries.

## Thermovent Exhibition

A comprehensive trade exhibition of Ekco "Thermovent" heating equipment, including the new "FR" and "SR" series of convection heaters and the new Thermopanel "Radiant Glass" heater, is shortly to visit many of the main provincial centres. It will be staged

first at the Grand Hotel, Bristol, 14th–15th September, and then at Queens Buildings, Belfast (24th–25th September), More's Hotel, Glasgow (1st–2nd October), Engineers' Club, Manchester (7th–8th October), and Imperial Hotel, Birmingham (19th–20th October).

## P.O.A. Raw Material Survey

A new booklet "Natural and Synthetic Fibres" (price 3s 6d) completes a series of eighteen booklets which have been prepared by the Purchasing Officers' Association, Wardrobe Court, 146a, Queen Victoria Street, London, E.C.4, chiefly to cover the syllabus of its final examination subject "Raw Materials (Economic and Geographical Survey)." The series provides factual information not only for the student but also anyone interested in the study of world sources of supply of the main materials of industry.

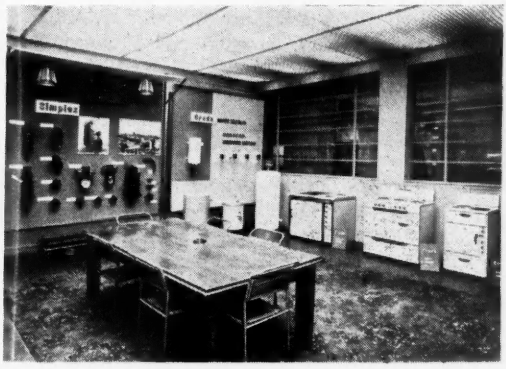
## Installation Rules and Tables

The fifth edition of Ibbetson's "Electrical Installation Rules and Tables," which has been edited by P. A. Rowland, is now available from E. & F. N. Spon, Ltd., 15, Bedford Street, London, W.C.2, price 7s 6d. This pocket-sized work of reference, which contains 210 pages of useful information for practical wiremen, electricians, engineers, contractors and architects, has been revised to take account of the latest I.E.E. Regulations. It also includes new definitions and data pertaining to lighting. Apart from its obvious value to the practical man, it will also be of use to students studying for the City and Guilds Examination in Electrical Installation Work.

## Simplex Showroom

In the accompanying picture we show a section of the new showroom of the Simplex Electric Co., Ltd., which has recently been opened at the company's head office and works at Oldbury. The display includes cookers, water heaters and switchgear.

**The new showroom at Oldbury of the Simplex Electric Co., Ltd.**




## Lighting Sales Conference

On 4th and 5th September, one of the largest conference gatherings of recent years in Durham was arranged by the Atlas Lighting Division of Thorn Electrical Industries, Ltd., whose factory at Spennymoor has recently been reorganized to take over the production of fluorescent lighting fittings and control gear previously carried out at the Hirwaun (South Wales) factory destroyed by fire earlier in the year.

Delegates were shown the modern plant, some of which has been laid down and brought into full production in the space of less than five months. On Saturday, in the ballroom of the Three Tuns Hotel, the conference was held at which Mr. Jules Thorn, founder, chairman and managing director, outlined the company's activities. Talks and discussions on a wide variety of technical and commercial matters followed and the autumn sales campaign was inaugurated. On the conclusion of the conference, a visit to Durham Cathedral was arranged. In the evening a dinner was held in the ballroom of the Three Tuns Hotel. In addition to Atlas lighting equipment, the company is now producing "Ferguson" receivers, "Tricity" cookers and domestic appliances, Smart and Brown "Hi-craft" lighting fittings and "Thorn" circuit breakers for high speed aircraft at the Spennymoor factory.

## Educational

A course of about thirty weekly lectures on "Elements of Electric Lighting Practice," by Mr. G. V. McNeil, commences on 22nd October at the South East London Technical College (Department of Electrical Engineering and Applied Physics), Lewisham Way, S.E.4. The fee for the course is £1 10s. There will also be a course of twenty-six lectures on "Vector Analysis and Fundamental Electro-magnetic Theory," by Mr. E. R. Trendell, commencing on 14th October (fee £1 4s). Applications should be made to the head of the Department.

As part of Liverpool University's annual programme of advanced refresher courses for graduate research workers, engineers and others in industry or research establishments, the Department of Extra-Mural Studies is arranging, in collaboration with the Department of Electric Power Engineering, a

course of eight lectures on the theory and applications of the electric arc, by Dr. H. Edels, a lecturer in the Department of Electric Power Engineering who was formerly on the staff of the English Electric Co., Ltd. The course will be held on Tuesdays at 7 p.m., commencing 13th October, and the fee is £2 2s. Further particulars may be obtained from the Director of Extra-Mural Studies, 9, Abercromby Square, Liverpool, 7.

A course of lectures on electronic motor control will be given on Wednesday evenings at the Technical College, Bradford (Department of Electrical Engineering), from 30th September to 18th November. The fee for the course is £1 10s and further particulars can be obtained on application to the College.

## English Electric Service Depot

The English Electric Co., Ltd., has recently opened a London service depot at Belsize Crescent, Hampstead. It has well-equipped workshops, one for domestic appliances and the other for television servicing. A fleet of vans has been assigned to the depot, some of which are fitted out as mobile work benches. The new establishment provides servicing facilities within the metropolitan area for all the company's appliances with the exception of cookers, and a "back-up" service for "English Electric" television receivers in the Alexandra Palace transmission area. Two "back-up" depots for television have been opened in Cardiff and Glasgow, covering installations in South Wales and the Kirk o' Shotts transmission area.

## I.H.V.E. Examinations

The next examinations of the Institution of Heating and Ventilating Engineers will be held in April and May, 1954. Section A will be held from 5th to 9th April, and Section B on 20th, 21st and 22nd May. Candidates who have already submitted proposal forms for membership and have been accepted as examination candidates must submit an examination application form (obtainable from the secretary) before 28th February, 1954 (31st January for overseas candidates). Candidates who have not previously made application are required to submit proposal forms for membership, and these must be considered by the Committee before permission to enter the examination can be granted. Such proposal forms must be received by the secretary not later than 31st December.

## Commercial Travellers' Employment Conditions

The United Commercial Travellers' Association of Great Britain and Ireland, 180-182a, Tottenham Court Road, London, W.1, has issued a booklet "Terms and Conditions of Employment for Commercial Travellers," which surveys conditions of employment as at the beginning of 1952 in thirty-four trade groups. To facilitate comparison between the trades listed and relevant factors applicable to each trade, the statistics have been set out in the form of percentages for each section within the trades, with a grand summary for all the trades listed.

## Machinery Catalogue

Before the war George Cohen, Sons & Co. Ltd., Cunard Works, Chase Road, London, N.W.10, regularly issued catalogues of their entire stock of new and secondhand plant and machinery. Their publication was abandoned during the war owing to paper restrictions, but with the easing of the paper situation the company has now issued its first comprehensive post-war catalogue of over 200 pages containing illustrated particulars of machinery in stock. Further editions will follow three or four times a year.

## Trade Announcements

Mr. T. H. Fletcher, 27, Kingsfield Drive, Didsbury, Manchester, 20, has been appointed to represent **J. Day & Co. (Derby Works), Ltd.**, in Lancashire, Yorkshire, Cheshire and North Wales.

From 1st September **Oliver Pell Control, Ltd.**, incorporating the Varley Magnet Co., has become the sole selling agents for Besson & Robinson, Ltd., for their relays, delay switches and timing devices.

A new depot is being opened by **F. D. Newcombe & Co., Ltd.**, on 1st October at 66, Union Street, Camborne, Cornwall (telephone : Camborne 3427).

**Mr. K. P. Wood,** M.A.(Cantab.), who resigned from the board of James Beresford & Son, Ltd., in July, has now started his own business at 71, Temple Row, Birmingham, 2. His activities include representation in the Midlands of Edward Holme & Co. (1931), Ltd., and the K.S.B. Manufacturing Co., Ltd.

## Catalogues and Lists

**Simplex Electric Co., Ltd.,** Broadwell, Oldbury, Birmingham.—Illustrated leaflet announcing the new 4½ cu ft general purpose roasting oven designed for heavy duty cooking equipment.

**Metropolitan-Vickers Electrical Co., Ltd.,** St. Paul's Corner, 1-3, St. Paul's Churchyard, London, E.C.4.—Illustrated catalogue of industrial lighting fittings and floodlights together with four page price supplement (S.P.7116/2).

**Walter Logan & Co., Ltd.,** 26, Downing Court, Brunswick Square, London, W.C.1.—Catalogue illustrating a range of "Rekofa" brush-holders, cartridge holders, collectors, slip-rings, collector oil and contact material.

# Public Lighting Conference

*Summary of Papers Read at Liverpool*

ABOUT a thousand delegates from local authorities and Electricity and Gas Boards throughout the country have been taking part in the annual conference of the Association of Public Lighting Engineers at Liverpool which closes to-day (Friday). There have also been many visitors from abroad at the various technical sessions at the Picton Hall. During the conference, which opened on Tuesday last, delegates have been able to inspect the latest street lighting fittings, ancillary apparatus and columns, which were reviewed in last week's issue.

After the annual general meeting on Tuesday morning, Mr. C. C. Smith, city lighting engineer, Liverpool, was inducted as president, and the conference was then officially opened by the Lord Mayor of Liverpool, Alderman W. John Tristram.

## Presidential Address

In his presidential address, delivered at the afternoon session, Mr. Smith said that the road safety aspect of public lighting was only one of several, but it was more than sufficient to provide the spur to greater effort. It was immaterial whether this additional effort was made on the technical side, in tackling the problems involved in the development of new or improved techniques or equipment, or, in the administrative sphere, perhaps towards a solution of the difficult financial problem confronting particularly the smaller authorities in the lighting of main roads.

The fact that difficulties were encountered was not peculiar to public lighting for they existed in all walks of life. It was in the solution of such difficulties that public lighting engineers could be different. He thought that the key to the problem was co-operation between all concerned.

Following the presidential address Mr. Geoffrey Fitton, engineer and manager, Neath Undertaking, Wales Gas Board, presented a paper in which he dealt with the utilization factor in public lighting.

On Wednesday morning Mr. J. B. de Boer, Light Technical Laboratory, Philips, Eindhoven, dealt with criteria in the quality of street lighting. He said that the essential criteria of quality for the lighting of a road for fast traffic were the luminance of the road surface and its uniformity, the contrast between luminance of objects on the road and their background, and the degree of glare experienced in the installation.

On the basis of studies carried out in the United Kingdom and the Netherlands, quantitative data for these criteria had been applied for three types of installations, equipped respectively with fixtures with a light distribution of the high-angle type, of the medium-angle type and of the cut-off type. As the first two types of installations were frequently encountered in the United Kingdom, whereas the latter type was more representative of Continental installations, a fundamental comparison between the conceptions of street lighting in different countries was obtained.

All three installations were satisfactory so far as the general level and uniformity of luminance was concerned. The contrasts were sufficiently high, except in the case of cut-off lanterns, where an object with a reflection factor of 0·15 or higher would not be seen at every place on the road. Glare remained within comfortable limits only in the case of the cut-off installation.

## Lantern Design

On Thursday morning Mr. M. H. Mounsdon (G.E.C.) presented a paper on the design and manufacture of street lighting lanterns. After explaining the organization necessary for the design and manufacture of street lighting fittings he dealt in detail with many of the problems which faced the designer illustrated by descriptions of several fittings at present in production.

The completion of a sound design was not the end of the story; putting it into production alongside other lanterns and

maintaining a standard of quality demanded a system if it was to continue successfully year after year. Regular inspection, both of parts and completed lanterns, could only work if the drawings of the design stated not only the dimensions that affected the working and manufacture of the lantern, but also the materials and finishes, where these were important. A works, faced with a temporary shortage and a desire to meet a delivery promise, might change the material of a screw and invite corrosion. The supplier might never know but the user would find out. The user had to maintain the lantern during its life and justify his choice, long after it had been forgotten by the manufacturer and the supplier. He would ultimately judge their efforts and be able to tell them whether or not it was a good design.

During the afternoon session M. André Boereboom, General Director of Electricity and Electromechanics, Ministry of Public Works, Belgium, and president of the Belgian National Commission of Public Lighting, read a paper on public lighting in Belgium. He said that since the war the majority of street lighting installations in Belgium had been extended and modernized. The most common lamps were 85 W sodium, 80 W mercury and 40 W fluorescent. The present tendency was towards higher wattage lamps; the sodium lamp now recommended was the 140 W. The 80 W mercury vapour lamp was being less and less used in favour of the 125 W while waiting for the 250 W lamp which had just appeared on the Belgian market. Fluorescent lamp fittings usually housed three or four 40 W tubes.

To reduce glare, use was made in most cases of the cut-off type of fitting, but the introduction of fluorescent lamps had modified this tendency. The siting of light sources in Belgium was unusual. Central suspension was common practice and gave good results when the streets were narrow.

Fluorescent lanterns were usually inclined 10 to 15 deg above the horizontal to project more light towards the centre of the road. The first installations were based on this idea and it had persisted even though its advantages were illusory.

To-day, Friday, Mr. W. H. Lythgoe (Cable Makers' Association) is to give a lecture, illustrated by lantern slides, reviewing the manufacture of modern types of electric power cables with which the public lighting engineer is likely to be concerned.

## Prospects in Denmark

TRADE exchanges between the United Kingdom and Denmark during the past few years have continued at a high level, although there has been a steady movement towards the pre-war pattern of a large Danish surplus with the United Kingdom. In his review of the economic and commercial conditions in Denmark (H.M. Stationery Office, 3s 6d net), Mr. S. Simmonds, lately Counsellor (Commercial), H.M. Embassy at Copenhagen, states, however, that with the progress of liberalization and the revival of Germany, United Kingdom firms have now to meet increased competition in the Danish market. In some cases United Kingdom manufacturers have lost ground because of long delivery periods and in others prices have not always been competitive. The improving prospects of importing fuel and steel from the United Kingdom should be accompanied by increased possibilities of marketing British goods in Denmark in 1953, but it should be stressed that in general stocks are high. Imports of electrical machinery, apparatus and accessories into Denmark were valued at £63,283 in 1949, £92,359 in 1950 and £115,700 in 1951, and the United Kingdom's share for each of these years was £27,389, £26,713 and £33,897, respectively.

Mr. Simmonds says that the heavy, light and electrical engineering industries are making great efforts to increase production, and this group constitutes one of Denmark's major export industries. The main products include diesel engines, refrigerating equipment, electric motors and vacuum cleaners. Almost the entire output of wire and electric cables is concentrated in the Northern Cable & Wire Works, Ltd., Copenhagen, whose production of cable and conductor wire in 1950 was 22,000 metric tons, valued at Kr. 93·1 million, as compared with 18,000 metric tons (Kr. 68·4 million) in 1949. Exports in 1950 were 1,465 tons as compared with 1,706 tons in 1949 and 985 tons in 1939.

Production of radio receivers in 1950 was valued at Kr. 44 million (109,000 sets), as compared with 84,000 sets valued at Kr. 37 million in 1949. Imports are in general confined to special equipment, such as communication apparatus, components and valves.

# I.E.E. LONDON MEETINGS

## *Arrangements for First Half of Session*

THE 1953-54 Session of the Institution of Electrical Engineers commences on 8th October when Mr. H. Bishop, the President, will deliver his inaugural address. Readers may wish to make special note of meetings at which papers dealing with subjects in which they are particularly interested are to be read, and we therefore give below the arrangements for the first half of the Session.

### ORDINARY MEETINGS

8th October: Inaugural Address as President, by H. Bishop. 5th November: "The Co-ordination of Insulation of High-Voltage Electrical Installations," by J. S. Cliff. 3rd December: "Technical Arrangements for the Sound and Television Broadcasts of the Coronation Ceremonies on 2nd June, 1953," by W. S. Procter, M. J. L. Pulling and F. Williams. 7th January: "Continuity of Electricity Supply," by H. Leyburn.

### INFORMAL MEETINGS

19th October: Discussion on "Television," opened by the President. 16th November: Discussion on "Illuminations and Decorative Lighting," opened by H. Carpenter. 7th December: Discussion on "The Ridley Report," opened by C. T. Melling. 18th January: Discussion on "The Role of the Consulting Engineer," opened by T. G. N. Haldane.

### EDUCATION DISCUSSION CIRCLE

13th October: Discussion on "How Should the Action of Polyphase Commutator Motors be Approached?" opened by I. L. Stefani. 9th November: Discussion on "What are the Requirements of Electrical Engineering Textbooks?" opened by Instr.-Cdr. D. K. McCleery. 9th December: Discussion on "The Teaching of Electrical Machine Design," opened by Prof. M. G. Say. 20th January: Discussion on "The Teaching of Magnetic Materials," opened by Prof. F. Brailsford.

### RADIO SECTION

14th October: Chairman's Address, by J. A. Smale. 26th October: Discussion on "Long-Playing Disc Records Compared with Magnetic Tape for Sound Reproduction in the Home," opened by H. F. Smith. 11th November: "Some Aspects of the Design of V.H.F. Mobile Radio Systems," by E. P. Fairbairn. 23rd November: "Loudspeaker Systems—Recent Trends in Design," by Major A. E. Falkus. 30th November: Section Soiree (at the Institution, at 6.30 p.m.). 2nd December: "Telegraph Codes and Code Convertors," by T. Hayton, C. J. Hughes and R. L. Saunders. "Code Convertors for the Interconnection of Morse and Teleprinter Systems," by R. O. Carter and L. K. Wheeler. 14th December: Discussion on "Will Transistors oust Receiving Valves?" opened by E. H. Cooke-Yarborough. 13th January: "A Single-Sideband Controlled-Carrier System for Aircraft Communication," by G. W. Barnes. 25th January: Discussion on "Should Sound Broadcasting of the Future be entirely in the V.H.F. Band?" opened by A. J. Biggs.

### MEASUREMENTS SECTION

20th October: Chairman's Address, by J. F. Coales. 3rd November: Discussion on "Standardized Protective Transformers from the Point of View of Maker and User," opened by H. S. Petch and J. G. Wellings. 10th November: Section Dinner. 17th November: "Alternating-Current Instrument Testing Equipment," by A. H. M. Arnold. 1st December: Discussion on "The Influence of Legislation on the Costs of Metering," opened by S. Howarth. 8th December: "The Determination of Optimum Process-Controller Settings and their Confirmation by means of an Electronic Simulator," by R. L. Ford. "The Effects of the Addition of some Non-linear Elements on the Transient Performance of a Simple R.P.C. System Possessing Amplifier Saturation," by J. C. West, J. L. Douce and R. Naylor. "The Step Function Response of a R.P.C. Servo Mechanism possessing Torque Limitation," by J. C. West and I. R. Dalton. 5th January: "A Scaling Unit Employing Multi-Electrode Cold-Cathode Tubes" and "A Sensitive Pulse Trigger Circuit with a Stable Threshold," by K. Kandiah. "The Development of a Neutron Spectrometer for the Intermediate Energies," by F. S. Goulding, J. C. Hammerton, M. G. Kelliher, A. W. Merrison and E. R. Wiblin. 19th January: Discussion on "High-Sensitivity Wattmeters," opened by A. H. M. Arnold.

### SUPPLY SECTION

28th October: Chairman's Address, by L. G. Brazier. 25th November: "A New Approach to the Theory and Operation of Electrostatic Precipitators for Use on Pulverized-Fuel-Fired Boilers," by N. Troost. 16th December: "Some Design Features of the Semi-Outdoor Power Station at Ince," by F. H. S. Brown. 27th January: Particulars to be announced later.

### UTILIZATION SECTION

22nd October: Chairman's Address, by B. L. Metcalf. 19th November: "The Wear of Carbon Brushes at High Altitudes," by R. F. Sims. 10th December: "Electric Lifts in Post-War Housing," by C. G. L. Morley. 20th January: Section Dinner-dance (at the Caf Royal). 21st January: "Electricity in the Wool Textile Industry," by A. J. Francis and T. H. Carr.

### EXTRA MEETING

12th November: Discussion on "Safety Precautions in Electronic Apparatus, with particular reference to Medical Applications," opened by H. W. Swann and W. Grey Walter.

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## Power from Niagara

AN additional $43·8 million expenditure on Ontario hydro-electric power projects at Niagara Falls has been approved. The total amount allocated—$343·7 million—will finance work already under way on the Sir Adam Beck No. 2 generating station and the following projects: A storage reservoir nearly a mile square below the City of Niagara Falls; a pumping plant to raise water from the canal to the reservoir; and four additional 100,000 h.p. generating units. The reservoir will be started as soon as possible, but the four generating units will probably not be needed until 1962. The present programme is based on the hope that power will be available from the St. Lawrence in 1958; if this is not the case, the four additional Niagara units will probably be started earlier.

Measures to preserve the scenic beauty of the Falls have been approved in Ottawa and Washington. The remedial plan calls for a 1,550ft long control dam at the Grass Island Pool and excavation of a channel on the Canadian and Goat Island flanks of the Horseshoe Falls.

# Electricity in Food Preparation

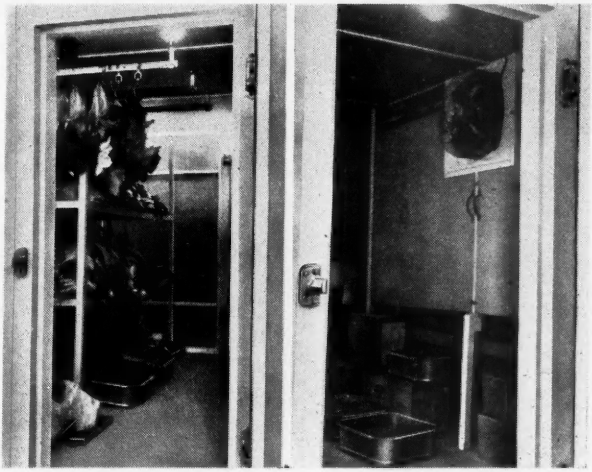
## *Equipment in a Dorset Establishment*

TWO years ago at Longham, Dorset, Mr. L. L. Murry, with one assistant, established the firm of Piper Products, Ltd., with the object of manufacturing chicken cutlets and other prepared foodstuffs. By May this year the business had developed to such an extent that it was necessary to acquire much larger premises at Poole which, although not yet fully equipped, are already producing 1,500 dozen 4 oz chicken cutlets a day as well as large quantities of doughnuts and other products. The cutlets are now sent by road and rail to hundreds of shops all over the country as far afield as Yorkshire, the arrangements being such that delivery is guaranteed within a day of manufacture. Even in warm weather the cutlets will keep fresh without refrigeration for four days, but they can be stored safely in refrigerated cabinets for a month.

Although the cutlets themselves are not a refrigerated product, refrigeration is almost indispensable in their manufacture. The chickens are bought in bulk at times of the year when they are plentiful and cheap and are kept in cold storage until required for manufacture. This makes it possible to keep the price uniform throughout the year.

The refrigerated storeroom, which has been designed by Aish & Co., Ltd., Poole, has a capacity of over 1,000 cu ft, about one-quarter of which is designed for freezing down to −5 deg F and the remainder for use as a chiller compartment with normal refrigerated storage at 30 deg F. The freezing portion is insulated with 8in of cork, the rest with 4in, the efficiency of the lagging being attested by the fact that the refrigeration units come into action only four or five times a day for periods of from 30 to 60 minutes a time despite fairly frequent opening of the door. A Trojan 15in fan circulating the cooled air in the chiller is of sufficient capacity (765

*Above:* **1,000 cu ft coldroom comprising a chilling compartment and (at the far end) a freezing section. The refrigeration units can be seen mounted one above the other on the left**



*Left:* **Fluorescent lighting is provided in the chilling compartment**

*Right:* **A 765 cu ft/min fan circulates the cooled air in the chilling compartment**

cu ft/min) to serve a 50 per cent greater capacity, the coldroom being designed to be readily extended if required, without additional refrigeration equipment.

To provide the refrigeration two identical Frigidaire AD3 units have been neatly mounted on a stand one above the other at the side of the coldroom, one serving the freezing compartment and the other the chiller. They are driven by 1 h.p. motors fitted with " Thermatrip " overload protection and are designed for simplicity of operation and the minimum of maintenance. For efficient running two special heat-interchangers are fitted.

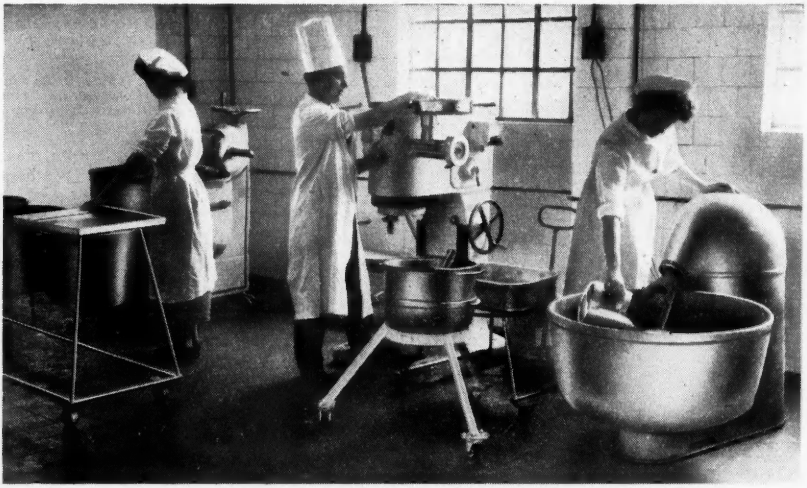
Fluorescent lighting is provided in the chilling compartment, Philips ballast type tubes being found to be suitable for the purpose without any special protection for use in the low temperature. A minor but practical feature of the fan control arrangements is that instead of having the automatic switch inset in the door jamb it has been fixed on the inside. This makes it possible to attend to any possible failure of the switch without interfering with the operation of the coldroom.

In the manufacture of the cutlets the chicken are taken straight from the coldroom, plucked and boned. With other ingredients (beef, carbohydrates, seasoning, etc., are added) the chicken is minced and mixed, the electrical equipment available for this purpose including a Reads & Barrus mixer with a capacity of 1½ cwt per mix; a Peerless & Ericsson 80 qt four-speed mixer capable of dealing with 2 cwt/hr; and another machine by the same makers, the bowl of which is rotated, the mixing being done by means of a hook moving up and down.

The prepared mixture is placed in a hopper and fed into a machine which rolls it out to the desired thickness. At present the cutlets are cut out by hand with the aid of appropriately shaped metal cutters, but a machine is in process of development (based on a technique involving air pressure which is used in making doughnuts) for carrying out this operation mechanically. The shaped cutlets are dipped in batter in the preparation of which a Peerless & Ericsson high-speed emulsifier is employed. This apparatus is also successfully utilized in the manufacture of tomato puree.

After the cutlets have been cooked in

**The batter in which the cutlets are dipped is prepared in a high-speed emulsifier**



**Mixing and mincing equipment used in the preparation of the cutlets**

deep fat fryers (over which there are two 18in extractor fans) they are placed in racks and cooled by air from two "Breeza" 18in fans driven by ½ h.p. motors. This arrangement is capable of dealing with 80 dozen cutlets an hour, but Mr. Murry has designed a continuous cooling tunnel which he is proposing to install shortly. With a capacity of six dozen per minute, this will be capable of quickly cooling the cutlets from the 200 deg F at which they leave the fryer first to 80–85 deg F and then finally to 10 deg F below ambient temperature. It will accommodate trays measuring 2ft 6in by 1ft 6in and holding six dozen each and it will travel through the tunnel at a rate of about 1 ft/min, the conveyor speed being variable.

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# NEXT WEEK'S EVENTS

### Monday, 21st September

LIVERPOOL.—Radiant House, Bold Street, 7.15 p.m. Incorporated Plant Engineers, Merseyside and North Wales Branch. "Paint in Industry," by P. I. Gay.

LONDON.—Northampton Polytechnic, St. John Street, E.C.1, 6 p.m. Institute of Metal Finishing, London Branch. "The B.N.F. Jet Test on Organic Bright Nickel Deposits," by Dr. J. Edwards.

### Tuesday, 22nd September

LONDON.—85, Minories, E.C.3, 5.30 p.m. Institute of Marine Engineers. Presidential address by Sir Gilmour Jenkins.

### Thursday, 24th September

LONDON.—At the Cinematograph Exhibitors' Association, 164, Shaftesbury Avenue, W.C.2, 7 p.m. Television Society. "Transistors and other Crystal Valves," by D. D. Jones.

NOTTINGHAM.—E.M.E.B., Smithy Row, 6 p.m. I.E.S. Nottingham Centre. Induction of chairman, Mr. N. C. Slater.

SHEFFIELD.—Grand Hotel, 7.30 p.m. Incorporated Plant Engineers, Sheffield and District Branch. "Electrical Factory Regulations," by H.M. Factory Inspector.

### Thursday, 24th September, to Sunday, 27th September

BRIGHTON.—Metropole and Grand Hotel. Purchasing Officers' Association. National Conference and "Minibition."

LONDON.—I.E.E. Supply Section. Summer visit to Porthcawl.

### Friday, 25th September

BATH.—South Western E.B., Old Bridge Street, 7 p.m. I.E.S. Bath and Bristol Centre. "The Use of Lighting in Horticulture," by J. J. French.

NOTTINGHAM.—Welbeck Hotel, 8 p.m. I.E.E. East Midland Centre. Buffet-dance.

STOKE-ON-TRENT.—Copeland Arms Hotel, 7.30 p.m. A.S.E.E. Stoke and Crewe Branch. "Estimating and its Relation to the Economics of Electrical Contracting," by W. H. Brooks.

# ELECTRICITY SUPPLY

## *Decision to Proceed with Kafue Scheme*

## *S.W. Scotland Board Revises Coal Clause*

SPEAKING in Salisbury, Southern Rhodesia, last week Sir Godfrey Huggins, Prime Minister of the interim Government of Rhodesia and Nyasaland, said that the Federation must have the £30 million Kafue hydro-electric scheme before the end of the decade. Mr. R. A. Nicholson, Economic Secretary of the Government of Northern Rhodesia, later said it had been agreed that the scheme should be regarded partly as a Northern Rhodesian and partly as a Federal project as soon as the Federal Government was ready to assume responsibility. They had been able to convince the Southern Rhodesian Government that early completion of the scheme was essential to safeguard an adequate supply of power to the copper mines and industry generally within the Federation. Agreement had also been reached on the necessity of carrying out the first stage of the Kariba scheme as soon as possible after work on the Kafue undertaking had been begun provided that investigations proved it to be economic in relation to alternative sources of power. No time would be lost in carrying forward the financial negotiations in London.

### *Generation in August*

The monthly statement of the Ministry of Fuel and Power shows that in August 4,391 million kWh was generated by the British Electricity Authority and the North of Scotland Hydro-Electric Board, an increase of 9·7 per cent compared with the corresponding month last year. At the end of the month the total installed plant capacity was 18,075 MW, the same as in the previous month.

### *330 kV Switchgear*

The first of six circuit breakers rated at 15,000 MVA has been delivered for installation in the new 330 kV system of Ohio Power Co., a subsidiary of the American Gas and Electric Co. The unit completely assembled, the *Electrical World* states, weighs 80 tons and is over 25ft high; it has three 3,550 gal oil tanks measuring 11ft in diameter. These breakers are of the steel-clad impulse oil blast type, having an interruption time of 3 cycles over the full current rating. Bushings are designed to withstand an impulse voltage surge of 1,175 kV and a 60 c/s per sec voltage of 555 kV. Each phase component is mounted with a pneumatically trip-free mechanism. Ten 25,000 MVA breakers are reported to have been ordered for later delivery.

### *S.W. Scotland Tariff Concessions*

A new basic figure for the coal price adjustment clause and a reduced rate for high load factor use are among amendments announced by the South West Scotland Electricity Board to its industrial maximum demand and restricted-hour tariffs which take effect on 1st October.

The " unit " price of these tariffs is at present related to a fuel cost of 38s a ton with an

**ELECTRICITY GENERATED AND CAPACITY OF PLANT INSTALLED**

| | Fuel consumed Thousand tons | | | kWh generated Millions | | | kWh sent out Millions | Installed capacity (m.c.r.) MW |
|---|---|---|---|---|---|---|---|---|
| | Coal | Coke and Breeze | Oil | Steam | Water power | Total* | | |
| British Electricity Authority .. | 2,352 | 62 | 5·9 | 4,274 | 18 | 4,299 | 4,028 | 17,510 |
| North of Scotland H.E.B. .. | 17 | 1 | 1·1 | 26 | 61 | 92 | 90 | 565 |
| Total for August, 1953 .. .. | 2,369 | 63 | 7·0 | 4,300 | 79 | 4,391 | 4,118 | 18,075 |
| Corresponding total for August, 1952 .. .. .. .. | 2,191 | 59 | 4·0 | 3,908 | 82 | 4,001 | 3,755 | 16,795 |
| Increase or decrease, per cent .. | +8·1 | +6·8 | +75·0 | +10·0 | −3·7 | +9·7 | +9·7 | +7·6 |
| Total to date (8 months), 1953 .. | 22,963 | 601 | 54·2 | 41,255 | 673 | 42,035 | 39,535 | |
| Total for corresponding months of 1952 .. .. .. .. | 21,799 | 536 | 43·8 | 38,271 | 804 | 39,175 | 36,891 | |
| Increase or decrease, per cent .. | +5·3 | +12·1 | +23·7 | +7·8 | −16·3 | +7·3 | +7·2 | |

* The total figure includes 6·7 million kWh generated by oil engines and 5·0 million kWh by waste heat plants in August.

adjustment of 0·0008d/kWh for each 1d by which the fuel cost differs from that figure. A more realistic basic cost of 60s a ton is now to be used and consequential adjustments are to be made in the "unit" rates as follows:—High voltage supply: 0·661d/kWh (against 0·45d). Medium voltage supply: 0·686d/kWh (0·475d). With a variation of 0·0008d/kWh the ultimate price payable by all consumers will, it is calculated, be the same as under existing tariffs. In the case of h.v. consumers, however, the coal variant has been reduced to 0·00075d/kWh and at the present estimated coal cost of 71s 9d a ton there will be a reduction to these consumers.

In order to encourage consumers to improve their load factor, a step-down rate has been introduced where the load factor is more than 50 per cent. In such cases the step-down rate will be 0·636d for high voltage supplies and 0·661d for medium voltage supplies and will apply in respect of all kWh used in excess of 365 per kW of maximum demand in each month.

High voltage supplies are in future to be defined as those metered at or above 650 V instead of 6,000 V as at present.

The Board states that it is not granting these reductions because of surplus revenue; indeed additional revenue is required, but the Board would prefer to obtain it from expansion of business rather than by increasing charges. To encourage consumers to make greater use of electricity at the times when there is an abundant supply available, cheap rates have already been introduced for restricted-hour and off-peak supplies, and it is for the same reason that lower rates are now being offered for high load factor use.

## *Church and School Tariffs*

The application of the Southern Electricity Board's standard commercial tariff to such places as churches, chapels and educational establishments has been the subject of representations to the Consultative Council which recently took the matter up with the Board. At last week's meeting of the Council at Reading it was reported that the Board had given preliminary approval to an amendment of a block tariff in the case of places of worship, Scout and A.T.C. huts and similar premises, church halls, village halls, Women's Institutes, and other social and recreational halls in which electricity was mainly used outside the peak periods. The tariff was to be varied as from the first normal meter reading following 30th September to provide for reduced lighting and space heating assessments of 80 and 20 kWh per kVA, respectively, instead of the present 160 and 40 kWh. This would only apply where the premises specified were not part of or adjacent to a large establishment. With regard to schools, colleges, residential halls, buildings used as charitable residential institutions such as homes for children or elderly people or for similar purposes, but not including hospital clinics, etc., which were used under the N.H.J. Act, the Board was unable to accept the Council's submission that use of electricity was mainly outside peak hours and, in the case of residential establishments, that the use of electricity in the residential portion had characteristics similar to those in private residences supplied under the domestic tariff. The Board offered, however, to investigate the load characteristics of these places more closely before reaching a final decision.

## *Commercial Electricity Costs*

A resolution expressing alarm at the "constant increases in the electricity charges for retail establishments" was unanimously approved by members of Derby Chamber of Trade at their quarterly meeting last week. The resolution also stated: "Regarding the new basis of assessment on floor space, it is considered that warehouse space should be excluded, and assessed separately on a lower basis; and it is further considered that in the event of a consumer selecting a tariff which proves to be uneconomic, that three months' notice of desire to change should be allowed, in lieu of twelve months now specified."

The president (Mr. A. G. Moult) said that there had been a substantial increase in charges between last year and this, and the East Midlands Electricity Board had now introduced a system of charges, based on floor space instead of wattage as formerly, which would cause a further increase.

## *Palestine Development*

According to a *Reuter* message from Jerusalem the Israeli Finance Minister has announced that the Israeli Government is investing £7 million in the Palestine Electric Corporation to increase the country's power production. The *Financial Times* reports that a London official of the Corporation stated that he had not received any notification of the Government's intention. He pointed out that negotiations with the Government had been in progress some little time and he hoped these talks would be concluded by the end of this month. He emphasized that in his view the £7 million would be in Israeli currency. The present rate for the Israeli pound ranges from par to 4s for various classes of transaction.

## *Blackpool Illuminations Switched On*

Blackpool illuminations, which this year have cost the town £70,000, were switched on last week. The two main approach roads to the town have modernistic illuminated pylons. Along the six-mile route from Starr Gate to Anchorsholme there is a mixture of old and modern, fact and fantasy and nursery scenes. Equipment used for the illuminations includes 300,000 lamps, 75 miles of cable and wiring, 50 miles festoon, 1,500 floodlights and searchlights, and more than 100 decorative designs.

# B.B.C. ACTIVITIES

## *Plans to Complete Television Coverage*

THE Report of the British Broadcasting Corporation for the year ended 31st March last (121 pp., H.M. Stationery Office, 4s 6d) in addition to giving an account of the home and foreign services provided and the financial position has a section on the work of the Engineering Division.

The lion's share of permissible capital expenditure fell to television which, with the opening in August, 1952, of a fifth high-power station at Wenvoe, Cardiff, became available to 80 per cent of the population—a proportion not attained in any other country. With the construction of five medium-power stations, awaiting Government sanction, the coverage will reach 84 per cent. Ten further stations contemplated, making twenty in all, will give complete national coverage for a single programme, for which frequency channels were allocated at last year's Stockholm Conference.

A more powerful television transmitting station at the Crystal Palace site will replace the obsolescent one at Alexandra Palace and extend the service to much of the south-east coast not covered by the projected transmitter on the Isle of Wight. All main television stations are now equipped with medium-power stand-by transmitters to maintain service at reduced power if the main equipment should fail. Two new mobile units (in Glasgow and Bristol) brought the total of this type to six.

Reference is made to the first relay of television programmes to be broadcast simultaneously in two countries from 8th to 14th July, 1952. Technically it is regarded as a notable success.

The number of television licences increased by 50 per cent to 2·1 million compared with 10·7 million for sound only.

### Proposed VHF Development

Serious concern is expressed about increasingly unsatisfactory reception of sound programmes (apart from that caused by interference from foreign stations) by about 8 per cent of the population of the United Kingdom. The only comprehensive long-term solution is held to be development at very high frequencies, plans for which are under consideration by the Government. As a short-term provision ten of twelve projected low-power " backing up " stations were commissioned, but the limit to the number of these, within the wavelengths available, without creating " mush areas " has nearly been reached.

Rebuilding of the Brookmans Park aerial (to the design by the Research Department) and of the mast radiator, introduced the previous year at Daventry for carrying the third programme, has extended the effective range of the home programme. Its success at Daventry enabled two more local low-power third programme transmitters (at Hull and Cardiff) to be closed. Fourteen low-power stations and one high-power transmitter are remotely or automatically controlled. Wavelengths and power in kW of transmitting stations are tabulated in appendices.

### Corporation's Finances

Owing to the retention by the Treasury of 15 per cent of the net licence income which reduced the Corporation's revenue from this source by £572,000, in spite of an increase of £878,000 due to a greater number of licences, the total income was insufficient by £63,000 to meet revenue expenditure. A net capital expenditure of £697,000 was drawn wholly from reserves, which are expected to be exhausted by the end of March, 1955, unless income from licences is substantially increased. Developments planned in both sound and television services are, nevertheless, being continued.

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### Mobile Television Unit Order

THE B.B.C. has ordered four complete television outside broadcasting units from Marconi's Wireless Telegraph Co., Ltd. Each one of the units will be equipped for any type of outside broadcast, with five cameras to each, and with controls and mixers for both vision and sound. Three cameras will normally be used for programme purposes, one will be kept ready as a spare if needed, and one as a pool of spare parts for maintenance.

## *Financial Section*

# STOCKS and SHARES

THE rise in Stock Exchange prices during the summer months was the more notable for having persisted in the face of an ominously reverse tendency in the Wall Street market. There is little direct connection nowadays between the two markets, but the behaviour of dollar stocks continues, of course, all over the world, to receive watchful attention as a barometer of American business sentiment. Last week's further deterioration in Wall Street is consequently held largely responsible for signs of increased caution in our own markets.

### Price Changes

Most of the interest in electrical equipment shares was taken up last week by the news from the A.E.I., Reyrolle and Parsons companies, to which reference is made below. Elsewhere the principal feature was another sharp rise, this time of 2s, in Decca shares, now 31s after being 32s. E.M.I. also improved. Southern Areas were noticeably well supported at 15s 9d (with recent bargains recorded up to 16s 6d), and among others which made ground were Sturtevant, Hoover and British Thermostat. Aberdare Cables were quoted, ex the share bonus, at 8s 6d.

### A.E.I. Bonus

On the company's proposal to distribute a 100 per cent capital bonus, Associated Electrical Industries ordinary shares rose to £4, a figure which gave cause for congratulation to the minority of stockholders who took up their allotment of the "repatriated" shares at 75s a few months ago, and to the underwriters of that issue. Later the price reacted to 79s 6d. In an accompanying statement, the chairman explains carefully the meaning and implications of the operation, which involves the capitalization of over £8·8 million of the reserves. Most of this is to come from the share premium account, which mainly represents cash already subscribed by stockholders. The balance will be drawn from the general reserves which have accumulated over past years out of the profits retained in the business to finance its development.

### Dividend Prospects

The chairman of A.E.I. points out that the share bonus operation has no effect upon earnings, and that if the gross amount distributed as ordinary dividend remains unchanged, the rate itself would be halved. The interim dividend for the current year is being maintained at 7½ per cent, and does not apply to the new shares. During the past year or so, investors have been taught by many examples to associate share bonuses with more liberal dividend policies. The austere 5 per cent yield basis on which the shares are quoted at present suggests that this idea is not ruled out as a possibility, sooner or later, in the case of A.E.I.

### Reyrolle and Parsons

Interim dividends of 6¼ per cent now declared by both the A. Reyrolle and C. A. Parsons companies compare with last year's corresponding payments of 5 per cent, which were followed by finals of 7½ per cent. Prices of the shares rose sharply in anticipation of the announcements, and both are half-a-crown to the good since a week ago. Apart from the latest news, hopes of a larger total for the year are supported on the very conservative rate of the last year's payments, and on the fact that the net sums then distributed were exceeded several times over by the amounts paid in excess profits levy, which expires after this year.

### Wireless Relay

Interest in the new British Relay Wireless and Television Company's 5s "A" shares seems to have been widening since their introduction to the market about two months ago. Dealt in originally at under 12s, they have been changing hands lately around 14s. A 16 per cent dividend was forecast in the prospectus, so that the expected yield is for the present about 5¾ per cent. The Pye and Murphy relay interests are incorporated in the group, and those two companies are largely concerned with its development on both the financial and technical sides. Combined sound and television relay services are already in operation in some areas.

### Telegraph Condenser

The 10s Telegraph Condenser shares at £2 have improved further on the rise which took place on the declaration of a 5 per cent interim dividend on account of the current year. It is at the same rate as before, but applies to capital increased by a 20 per cent capital bonus. Share bonuses were distributed also in each of the two preceding years. As a result, shareholdings have been doubled over this period, without any change, so far, in the amount per share received in dividend.

# ELECTRICAL INVESTMENTS

## *Past Week's Price Changes*

| Company | Dividend Previous | Dividend Last | Middle Price 14th Sept. 1953 | Week's Rise or Fall | Est. Yield p.c. £ | s | d |
|---|---|---|---|---|---|---|---|
| *Gilt-edged and Overseas Stocks* | | | | | | | |
| Brit. Elec. 1968/73 | 3 | 3 | 87½ | +½ | 3 | 8 | 6 |
| Brit. Elec. 1974/77 | 3 | 3 | 86 | — | 3 | 9 | 0 |
| Brit. Elec. 1976/79 | 3½ | 3½ | 93 | — | 3 | 15 | 3 |
| Brit. Elec. 1974/79 | 4½ | 4½ | 101 | — | 4 | 4 | 2 |
| Calcutta Elec. .. | 6† | 6† | 20/- | — | 6 | 0 | 0† |
| East African Power | 7 | 7 | 24/6 | — | 5 | 14 | 3 |
| Nigerian Elec. .. | 10 | 10 | 24/- | — | 8 | 6 | 8 |
| Palestine Elec. "A" | 5† | Nil | 17/- | −6d | | Nil | |
| Perak Hydro-Elec. | Nil | Nil | 16/6 | −6d | | Nil | |
| *Equipment and Manufacturing* | | | | | | | |
| AberdareCables(5/-) | 20 | 25 | 8/6xb | +6d | 7 | 7 | 0* |
| Aerialite (1/-) .. | 83½ | 88½ | 8/9 | — | 10 | 1 | 10 |
| Allen, W. H. .. | 15 | 15 | 46/- | +3d | 6 | 10 | 5 |
| Aron Elec. Ord. .. | 15 | 20 | 42/6 | — | 9 | 8 | 2 |
| Assoc. Elec. Ord. .. | 20 | 20 | 79/6 | +9d | 5 | 0 | 8 |
| Automatic Tel. & El. | 15 | 15 | 59/6 | +9d | 3 | 0 | 8 |
| Babcock & Wilcox | 18 | 18 | 66/- | −6d | 5 | 9 | 1 |
| Baldwin, H. J.(2/-) | 20 | 20 | 4/- | — | 10 | 0 | 0 |
| Bakelite (10/-) .. | — | 12½ | 19/- | — | 6 | 11 | 6 |
| British Aluminium | 12 | 12 | 41/- | — | 5 | 17 | 0 |
| B.I. Callender's .. | 9 | 10 | 37/- | — | 5 | 8 | 1 |
| British Thermostat (5/-) .. .. | 30 | 35 | 17/6 | +1/6 | | — | |
| British Vac. Cleaner (5/-) .. .. | 25 | 25 | 12/3 | — | 10 | 4 | 0 |
| Brook Motors (10/-) | 20 | 20 | 37/6 | — | 5 | 6 | 8 |
| Brush Ord. (5/-) .. | 10 | 4 | 4/- | — | | — | |
| A. F. Bulgin (1/-) | 30 | 30 | 2/10½ | — | 10 | 8 | 6 |
| Burco (5/-) .. | 38½ | 35 | 18/3 | — | 9 | 13 | 0 |
| Chloride El. Storage | 15 | 20 | 78/9 | — | 5 | 1 | 0 |
| Cole, E. K. (5/-) .. | 25 | 25• | 19/- | −6d | 6 | 11 | 7 |
| Cossor, A. C. (5/-) | Nil | 10 | 8 6 | −3d | 5 | 17 | 8 |
| Crabtree (10/-) .. | 17½ | 17½ | 29/- | — | 6 | 0 | 8 |
| Crompton Parkinson Ord. (5/-) .. | 11¼ | 11½ | 11/6 | −3d | 4 | 17 | 10 |
| De La Rue (5/-) .. | 35 | Nil | 8/9 | +3d | | — | |
| Decca (5/-) .. .. | 112½ | 150 | 31/- | +2/- | 4 | 16 | 3* |
| Dewhurst (2/-) .. | 22½ | 19• | 5/6 | — | 6 | 18 | 3 |
| Dictograph Tel.(2/-) | 20 | 20 | 5/6 | — | | — | |
| E.M.I. (10/-) .. | 12 | 12 | 15/- | +6d | 8 | 0 | 0 |
| Electrical Components (5/-) .. | 20 | 20 | 10/- | — | 10 | 0 | 0 |
| Elec. Construction | 15 | 15 | 52/6 | — | 5 | 14 | 3 |
| Enfield Cable Ord. | 7½ | 5 | 21/3 | — | 4 | 14 | 0 |
| English Electric .. | 15 | 15 | 52/6 | — | 5 | 14 | 3 |
| Ericsson Tel. (5/-) | 22† | 22•† | 39/- | — | 2 | 16 | 5† |
| Ever Ready (5/-) | 35 | 35 | 27/- | +6d | 6 | 9 | 8 |
| Falk Stadelmann | 15 | 15 | 42/3 | — | 7 | 2 | 0 |
| G.E.C. Ord. .. | 22½ | 11½• | 37/6 | — | 6 | 0 | 0 |
| General Cables (5/-) | 30 | 30 | 16/3 | — | 9 | 4 | 8 |
| Greenwood & Batley | 15 | 17½ | 40/- | — | 8 | 15 | 0 |
| Hackbridge Cable (5/-) . .. | 20 | 20 | 12/9 | — | 7 | 17 | 0 |
| Hackbridge Hewittic (5/-) .. .. | 20 | 20 | 17/6 | — | 5 | 14 | 2 |
| Hall Tel. Acc.(10/-) | 10 | 10 | 10/- | — | 10 | 0 | 0 |
| Heatrae (2/-) .. | 12½ | 12½ | 4/- | — | 6 | 5 | 0 |
| Henleys (10/-) .. | 20 | 10½• | 17/- | −6d | 6 | 3 | 6 |
| Holophane (5/-) .. | 15 | 20• | 12/6 | — | 8 | 0 | 0 |
| Hoover (5/-) .. | 35 | 25 | 26/3 | +6d | 4 | 15 | 3 |
| *Equipment and Manufacturing (continued)* | | | | | | | |
| Intl. Combustion (5/-) .. .. | 25 | 15• | 13/9 | — | 5 | 9 | 0 |
| Johnson & Phillips | 15 | 15 | 53/- | — | 5 | 13 | 2 |
| Lancashire Dynamo | 12½ | 12½• | 42/6 | — | 5 | 17 | 8 |
| Laurence, Scott(5/-) | 15 | 15 | 12/9 | — | 5 | 17 | 8 |
| London Elec. Wire | 12½ | 15 | 60/9 | — | 4 | 18 | 8 |
| J. Lucas .. .. | 7½ | 9½ | 43/9 | — | 4 | 3 | 10 |
| Marryat & S. (2/-) | 22½ | 22½ | 5/9 | — | 7 | 16 | 6 |
| Mather & Platt .. | 12½ | 15 | 50/6 | — | 5 | 19 | 0 |
| Metal Industries .. | 15 | 12• | 40/- | −3d | 6 | 0 | 0 |
| Mid. Elec. Mfg. .. | 15 | 15 | 58/3 | — | 5 | 2 | 9 |
| Murex .. .. | 15 | 15 | 54/6 | — | 5 | 10 | 1 |
| Newman Ind. (2/-) | 10 | 10 | 2/3 | — | 8 | 17 | 9 |
| Oldham & Son (1/-) | 35 | 17½• | 2/6 | — | 7 | 0 | 0 |
| Parnall (Yate) (5/-) | 6 | 6 | 3/9 | — | 8 | 0 | 0 |
| Parsons, C. A. .. | 10• | 12½ | 72/6 | +2/6 | 3 | 9 | 0 |
| Plessey (5/-) .. | 22½ | 25 | 26/9 | −3d | 4 | 13 | 6 |
| Pye Deferred (5/-) | 18 | 20 | 19/- | −3d | 5 | 5 | 5 |
| Revo (10/-) .. | 27½ | 27½ | 16/3 | — | | — | |
| Reyrolle .. .. | 10• | 12½ | 65/- | +2/6 | 3 | 17 | 0 |
| Scot. Cable (4/-) .. | 32 | 20• | 12/9 | — | 6 | 5 | 6 |
| Siemens Ord. .. | 10 | 10 | 35/- | −6d | 5 | 14 | 3 |
| Southern Areas .. | 5 | 6 | 15/9 | +1/- | 7 | 12 | 4 |
| Strand Elec.(5/-) .. | 17½ | 17½ | 8/3 | — | 10 | 12 | 2 |
| Sturtevant (5/-) .. | 17¼† | 18-1•† | 26/- | +1/- | 3 | 9 | 9† |
| Sun Elec. .. | 15 | 15 | 25/- | — | 12 | 0 | 0 |
| Switchgear & Cowans (5/-) .. .. | 22½ | 22½ | 14/- | — | 8 | 0 | 9 |
| Taylor, T. (5/-) .. | 20 | 25 | 20/- | — | 6 | 5 | 0 |
| T.C.C. (10/-) .. | 20 | 20• | 40/- | +1/3 | | — | |
| T.C. & M. .. .. | 10 | 8½• | 28/6 | −6d | 5 | 19 | 1 |
| Telephone Mfg.(5/-) | 10 | 10 | 7/6 | — | 6 | 13 | 4 |
| Thorn. Elec. (5/-) | 10 | 12½ | 11/- | — | 5 | 13 | 8 |
| Tube Investments | 25 | 15• | 61/- | — | 4 | 18 | 4 |
| Vactric (5/-) .. | Nil | Nil | 7/6 | — | | Nil | |
| Veritys (5/-) .. | 7½ | 10 | 4/6 | — | 11 | 2 | 2 |
| Walsall Conduits (4/-) .. .. .. | 70 | 70• | 44/6 | — | 6 | 5 | 10 |
| Ward & Goldstone (5/-) .. .. .. | 45 | 45• | 39/- | — | 5 | 15 | 9 |
| Watford (2/-) .. | 25 | 25 | 8/- | — | 6 | 5 | 0 |
| Westinghouse Brake | 14 | 15 | 57/6 | — | 5 | 4 | 2 |
| West, Allen (5/-) .. | 15 | 15 | 12/3 | — | 6 | 2 | 5 |
| *Trusts, Transport and Communications* | | | | | | | |
| Anglo-Am. Tel.: A Ord. .. .. | — | 6 | 84½ | — | 7 | 2 | 0 |
| Ord. .. .. | — | 3¾ | 57½ | — | 6 | 10 | 5 |
| Anglo-Portuguese | 8 | 8 | 21/3 | — | 7 | 10 | 7 |
| Brit. Elec. Traction: Def. Ord. (5/-) .. | 25 | 35 | 29/- | — | 6 | 0 | 8 |
| Cable & Wireless: Ord. .. .. | 8 | 8 | 135½ | — | 5 | 18 | 0 |
| 4% Loan .. | 4 | 4 | 97 | — | 4 | 2 | 6 |
| Calcutta Trams .. | 6† | 6† | 20/- | — | 6 | 0 | 0† |
| Cape Elec. Trams | 5 | 5½ | 10/- | — | 11 | 0 | 0 |
| Marconi Marine .. | 10 | 10 | 28/- | −6d | 7 | 2 | 10 |
| Oriental Tel. Ord. | 16 | 16 | 70/- | −6d | | — | |
| Telephone Props. | 8 | 8 | 5⅞ | +1/6 | | — | |
| Tele. Rentals (5/-) | 10 | 10• | 9/3 | — | 5 | 8 | 1 |

* After capital bonus. † Dividends are paid free of income tax.

The above quotations are based upon the middle prices given in the Stock Exchange Daily Official List

# REPORTS and DIVIDENDS

**Associated Electrical Industries, Ltd.**—In order that the issued ordinary share capital of the company may be brought into better relation with the actual capital employed in the business, the board has decided to recommend that £8,870,596, being part of the amounts now standing to the credit of share premium and reserve accounts and profit and loss account, be applied in paying up in full 8,870,596 unissued ordinary shares, and that these shares shall be distributed to the ordinary stockholders on the basis of one new share for each £1 ordinary stock held. To implement this recommendation, it is proposed to increase the authorized capital from £18,000,000 to £28,000,000 by the creation of 6,000,000 ordinary shares of £1 each and 4,000,000 unclassified shares of £1 each. The further 6,000,000 ordinary shares together with 3,129,404 ordinary shares already authorized but unissued, will be available for issue. After making the scrip issue, there will be a balance of 258,808 ordinary shares and 7,000,000 unclassified shares available for any future issue. The amount to be capitalized is made up as follows:—Share premium account, £6,104,730; reserve for increased replacement of fixed assets, £1,003,725; E.P.T. post-war refund suspense account, £49,345; other reserves, £1,364,403; part of balance on profit and loss account, £348,393.

In a statement issued with the proposals, Sir George Bailey (chairman) says that the greater part of the total, coming from share premiums, represents cash already subscribed by stockholders. The balance is represented by reserves and surplus which have accumulated out of the taxed profits of the company in past years after payment of dividends, and is part of the profits which have been necessarily retained to provide funds for the expansion of the business. The issue will not have any effect on the company's earning capacity, and assuming no change in the total gross amount distributed as ordinary dividend, the rate of dividend would be halved. The new ordinary shares, which will be converted into stock, will not rank for the interim dividend of 7½ per cent now declared. Last year's interim was also 7½ per cent.

An extraordinary meeting to consider the proposals will be held on 8th October.

**The Nigerian Electricity Supply Corporation, Ltd.**, held its annual meeting on 15th September. In his review of the past year Mr. G. Hemmant (chairman) said that the annual dry season was not unduly prolonged and the additional water impounded at Tenti, where the height of the dam had been raised in the previous year, proved to be sufficient to provide power up to the end of the dry season without any restriction of power consumption. During the year power rates were raised and the higher rates coincided with a considerably increased demand for power by all consumers. The sales of electricity rose from 54.8 million kWh in the previous year to 59.5 million in the year under review. Bulk sales to the Electricity Corporation of Nigeria increased by 20 per cent and had doubled in the last five years. They still represented only 9 per cent of their total sales. Good progress was now being made with the construction of the new Jekko power station which should be in operation in November.

**Baird Television, Ltd.** (formerly Scophony-Baird, Ltd.), reports that as a result of a low turnover for the year ended 31st March last, there was a group net loss of £5,372, as compared with a profit for the previous year of £23,945. The net loss figure was arrived at after crediting the £10,000 stock reserve created in the previous year. With the addition of £6,181 expenditure on development, etc., and £500 written off development account, and after crediting £4,400 unrequired provisions, the accumulated net loss of the group carried forward is £254,632. In his statement, Lt.-Gen. Sir Charles J. S. King (chairman) says that sales during the first half of the year were slow and difficult, and although sales were better during the second half, the board was unable to make up the lack of turnover in the earlier months. Since the year-end, sales for the Coronation almost completely cleared television stocks. Orders for the future are encouraging.

**Radio & Television Trust, Ltd.**—The accounts for the year ended 31st March last show a consolidated profit of £114,080, as compared with £48,465 in the previous year, and after deducting £69,318 for taxation, there is a net profit of £44,762 (against £35,545), reducing the debit balance carried forward to £742,948.

**Berry's Electric, Ltd.**, reports a trading profit of £48,242 for 1952-53 (against £84,736). The addition of other income makes £50,394 (£86,533), and the net balance, after deducting depreciation, etc., is £21,202 (£57,649), to which is added £38,156 brought forward, making £59,358 (£69,077). Taxation provisions absorb £13,329, and after payment of a dividend of 5 per cent (against nil last year), a balance of £40,529 is carried forward.

**C. A. Parsons & Co., Ltd.**, are paying an interim dividend of 6¼ per cent (against 5 per cent).

**A. Reyrolle & Co., Ltd.,** have declared an interim ordinary dividend of 6¼ per cent (against 5 per cent).

**Aberdare Cables (Holdings), Ltd.,** is paying an interim dividend of 5 per cent (against 10 per cent) on doubled capital.

## New Companies

**Electronic Laminations, Ltd.**—Registered 14th August. Capital £100. Manufacturers, importers and exporters of and wholesale and retail dealers in all kinds of electronic and electrical laminations and components, etc. Directors: W. V. S. Sinclair, S. E. Innes, D. G. C. Trench and P. Emmet-Love. Secretary: D. R. Scott. Regd. office: 162a, Sloane Street, S.W.1.

**T.L.F. Electricals, Ltd.** — Registered 27th August. Capital £2,000. Manufacturers of and dealers in transformers, convertors, armatures, magnetos, and general electrical plant of all kinds, etc. Directors: J. H. Ford and J. W. Low. Regd. office: 119, St. Cuthbert's Road, Gateshead, Co. Durham.

**E. & W. Smith (Electrical Engineers), Ltd.**—Registered 26th August. Capital £1,000. Directors: E. S. Smith and W. Smith. Regd. office: 22, Whitworth Road, Rochdale.

**London Hoist & Machinery Co., Ltd.**—Registered 3rd September. Capital £10,000. To acquire the business of an electric lift, crane, winch and pulley block manufacturer and engineer carried on by C. P. Medley at 103, Worship Street, E.C.2. Directors: C. P. Medley and G. C. J. Medley. Regd. office: 103, Worship Street, E.C.2.

**Smoothmaster, Ltd.**—Registered 3rd September. Capital £100. Manufacturers of and dealers in electric shavers and other electrical goods and appliances, hair waving, drying and cutting machinery, etc. Directors: Florence Morris and T. Studdeard. Regd. office: 72, Tottenham Court Road, W.1.

## Bankruptcies

**R. W. Scott,** 159, Bromley Road, Catford, London, S.E.6, lately carrying on business at 44, Market Parade, Rye Lane, Peckham, S.E.15, as Bromley Ignition Co., electrician.—First meeting held 16th September. Public examination 5th November at the County Court, Scarbrook Road, Croydon.

**A. E. Beaumont,** 216, Manchester Road, Thornton Lodge, Huddersfield, electrical and radio engineer.—Last day for receiving proofs for dividend 23rd September. Trustee, Mr. W. H. Meredith, 20, North Parade, Bradford, Official Receiver.

**F. B. Williams,** 62, Brynmynach Avenue, Ystrad Mynach, Glam, electrician, lately carrying on business at 123b, High Street, Blackwood, Mon, as an electrical retailer and contractor.—First meeting 21st September at the Official Receiver's office, 34, Park Place, Cardiff. Public examination 15th October at the County Court, Blackwood Road, Blackwood, Mon.

**K. J. Ward,** lately carrying on business at "Howard," Trusthorpe Road, Sutton-on-Sea, Lincs, as an electrical contractor.—First and final dividend of 7¼d in the £, payable on and after 22nd September at the office of the Official Receiver, 58-61, York Terrace, Regent's Park, London, N.W.1.

**P. Thomas,** 43, New Street, Ledbury, Herefordshire, lately carrying on business at 4, New Street, Ledbury, radio and electrical engineer.—Trustee, Mr. R. K. Clark, 37, Temple Street, Birmingham, 2, Official Receiver, released 2nd September, 1953.

**L. E. Lawson,** previously residing and carrying on business at 1, Northam Road, Six Dials, Southampton, under the style of Lawson's Radio, as a radio and electrical engineer.—Trustee, Mr. N. G. Randall, 100, Park Street, Grosvenor Square, London, W.1, released 22nd January, 1953.

## Australian Imports and Exports

IMPORTS of dynamo-electric machinery, appliances and equipment into Australia during the second half of 1952 totalled £A12,322,000 in value, a decline of £A3,400,000 on the corresponding period of the previous year. From the accompanying table showing the chief groups it will be seen that the cut in Australia's external purchases was much more marked in consumer goods than in capital equipment. During the period under review Australia's aggregate imports of merchandise fell by roughly 50 per cent—a much greater proportional fall than was recorded for electrical material.

| Class of Goods | Six months ended December 1951 £A (000) | 1952 £A (000) |
|---|---|---|
| Batteries and accumulators .. | 415 | 199 |
| Cable and wire, covered .. .. | 1,451 | 1,608 |
| Communication equipment, including radio .. .. .. .. | 2,943 | 1,258 |
| Dynamo-electric machines .. .. | 3,432 | 3,061 |
| Heating and cooking appliances .. | 842 | 143 |
| Lamps, filament .. .. .. | 564 | 91 |
| Protective equipment .. .. | 491 | 378 |
| Regulating, starting and controlling apparatus .. .. .. .. | 2,388 | 2,447 |
| Sparking plugs .. .. .. | 327 | 123 |
| Transformers and rectifiers .. .. | 1,619 | 2,027 |
| Other electrical machinery and appliances .. .. .. .. | 1,237 | 987 |

During the same period Australian exports of dynamo-electric machinery and electrical appliances and equipment totalled £A877,000 in value compared with £A894,000 during the corresponding period of 1951. The total included batteries and accumulators £A162,000 (£A230,000) and communication equipment £A287,000 (£A229,000).

# LAMP PUBLICITY

## *Further Details of Manufacturers' Plans*

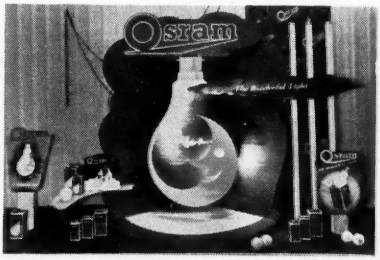
FOR this season's "Osram" lamp publicity campaign of the General Electric Co., Ltd., dealers have been sent a broadsheet explaining how they can benefit from the campaign.

There will be new advertisements in the national and provincial Press and "home" magazines. In the magazines colour pages are being used. These advertisements feature humorous figures — with lamps as heads. Rhyming couplets and the copy explain the boons of good lighting in the home. Catalogues and literature to back the dealers' efforts will be available as before.

Fluorescent tubes will be advertised in the industrial and commercial technical Press as well as in journals reaching all classes of shopkeepers. Hoarding coverage will be as in previous years. For this a new poster has been designed by Abram Games. Its "moon and lamp" theme is repeated in display material available to dealers. Posters will appear on 3,300 sites throughout the country. There is a "moon and lamp" window unit embodying "Osram" lamps and tubes, a "moon and lamp" display cut-out, a "Silverlight" comparison unit, and a day and night illuminated window sign.

The "Osram" lamp sign at the Piccadilly end of Coventry Street has now been replaced by a new version.

Philips Electrical, Ltd., is continuing its poster campaign for Philips lamps in the London Underground, and in the provinces an extensive 16-sheet outdoor poster campaign is again being arranged. A new design is being used. The Philips "Argenta" lamp is shown presented by a cheerful genie with the slogan, "Philips 'Argenta' lamps with the magic velvet light." A double crown version will be available for local "tie-ups." By means of the "Press and Compare" counter unit, the customer can see the advantages of the "Argenta" lamp as compared with the pearl type, and additional interest is created by a full size cut-out of a charming young woman holding a Philips lamp carton, and calling attention to the slogan, "Take a spare 'Argenta' lamp now." More specialized items include counter displays for "Photoflux" flash-bulbs and showcards for darkroom and internal reflector photoflood lamps. New publicity material for infra-red lamps used for animal and poultry rearing will be ready shortly.




**"Osram" lamps and tubes are shown in this window display unit which follows the "moon and lamp" theme of the new poster**

The annual light group catalogue includes fittings as well as lamps and is being issued this month. The special lamp catalogue lists additions to the range of projector and photographic lamps. Press advertising continues in electrical and photographic journals, and in farming journals for infra-red lamps.

**A new Philips 16-sheet poster**

## Turkish Contracts

THE Turkish Government has signed a contract with an American firm for the construction of the Seyhan Dam, which is intended to provide hydro-electric power, flood control and irrigation. This project was made possible by an International Bank loan of $25·2 million. The contract for the erection of the power transmission lines of the Etibank's electricity undertakings in north-west Anatolia was secured by an Italian firm. The work is to be divided into two parts, a network of 510 km costing $6 million and another of 515 km costing $5·7million. The first part is to be put in hand at once, for completion in three and a half years and the whole scheme should be completed in six years.

# NEW PATENTS

## Electrical Specifications Recently Published

*The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s 8d each including postage) will be obtainable after 28th October, from the Patent Office, 25, Southampton Buildings, London, W.C.2.*

**1949**

18504. British Thomson-Houston Co., Ltd.—Distance indicating devices with reduction gearing. 11th July, 1950. (698869.)

26593. Télémecanique Electrique.—Electric circuit arrangement of d.c. motors for hoisting machinery. 17th October, 1949. (698871.)

26808. Heaton, R. A., Struszynski, W., and Buckingham, J.—Radio-frequency transformers. 19th October, 1949. (698872.)

**1950**

874. Electropol, Ltd.—Electrolytic polishing and cleaning of metals. 11th April, 1941. Addition to 622118. (699013.)

3386. Power Jets (Research & Development), Ltd.—Electrostatic gas cleaners. 26th January, 1951. (698874.)

4023. Pye, Ltd.—Television cameras. 16th May, 1951. Cognate application 6101, 10th March, 1950. (699074.)

4302. Lany, B. P. de, and Copeland, P. L.—Metal vapour electric-discharge tubes. 20th February, 1950. (698875.) 4303. Electric-discharge devices. 20th February, 1950. (698876.)

13358. General Electric Co., Ltd., and Tombs, N. C.—Ceramic dielectric compositions. 22nd May, 1951. (698946.)

14691. National Research Development Corporation.—Radiation level indicating circuits for use in conjunction with a radioactive source. 13th June, 1951. (699081.)

15699. Loewy Engineering Co., Ltd.—Extrusion of aluminium cable sheathings. 30th May, 1951. Cognate applications 15700, 23rd June, 1950, 18678, 26th July, 1950, and 18679, 26th July, 1950. (699082.)

17550. British Insulated Callender's Cables, Ltd.—Mountings for reels, bobbins and the like. 12th July, 1951. (699084.)

20108. Fusare, Ltd., and Stretton, H. J.—Welding electrodes. 2nd November, 1951. (698885.)

22742/5. Walsall Conduits, Ltd.—Dolly-operated electric switches. 13th September, 1951. (699092/5.)

24342. Dewhurst & Partner, Ltd., and Dewhurst, M.—Snap-action electric switchgear. 5th October, 1951. (698892.)

25868. Vaughan, J. H., and Woodward, C. H.—Means for protecting electric conductor rails. 23rd January, 1952. (699098.)

26945. Marconi's Wireless Telegraph Co., Ltd.—Colour-television systems. 5th July, 1951. (698949.)

28475. Nalder Bros. & Thompson, Ltd., and Lipman, C. L.—Electrical measuring and/or repeating instruments and relays. 20th February, 1952. (699101.)

28653. National Research Development Corporation.—Electrical pulse shaping circuits. 23rd November, 1951. (698950.)

29984. Pye, Ltd.—Television cameras. 7th March, 1952. (699104.)

30339. British Thomson-Houston Co., Ltd.—Concentric keep-alive electrode arrangements in electric discharge devices, such as t.r. switches. 14th November, 1951. (698896.)

30643. Hardinge, J. H. C. von D.—Electro-magnetically operated diaphragm pumps. 17th October, 1951. Cognate application 1301, 17th January, 1951. (699105.)

**1951**

2349. Elliott Bros. (London), Ltd.—Thermionic valve amplifiers capable of amplifying direct electric currents or voltages. 29th January, 1952. (698899.)

3245. Siemens Bros. & Co., Ltd.—Manufacture of metal tubing and dies therefor. 8th February, 1952. (698033.)

3579. British Thomson-Houston Co., Ltd.—Circuits deriving unidirectional current from an a.c. source. 14th February, 1951. (698901.)

4069. Ministry of Supply.—Preparation of radioactive isotopes. 20th February, 1952. (699034.)

4478. Richardot, E. F., and Hely, G. T. A. J.—Mounting or supporting members for electric insulators. 13th February, 1952. (699115.)

7724. English Electric Co., Ltd.—Fluid container drain or supply valves. 14th March, 1952. (698961.)

9445. General Electric Co., Ltd., and Lindell, A. O. E.—Apparatus for use in the manufacture of crystal contact devices. 23rd April, 1952. (698906.)

9532. General Electric Co., Ltd., Antrich, D., and Gardiner, H. W. B.—Apparatus for measuring the frequency of alternating currents or speed. 9th April, 1952. (699036.)

11518. Wolseley Sheep Shearing Machine Co., Ltd., and Macnamara, H. J.—Electrical-impulse control mechanism for electrified fencing. 30th April, 1952. (698970.)

12708. Sperry Products, Inc.—Ultrasonic pulse echo systems. 30th May, 1951. (698975.)

13183. Edison Swan Electric Co., Ltd., and Ansell, K. W.—Electric lighting fittings. 31st March, 1952. (699150.)

13931. Bendix Aviation Corporation.—System for composite cathode-ray tube indication. 12th June, 1951. (698909.)

14936. National Research Development Corporation.—Variable electrical resistance type pick up devices. 23rd June, 1952. (698981.)

15503. Leeds & Northrup Co.—Impulse telemetering systems. 29th June, 1951. (698983.)

15999. General Electric Co., Ltd., and Pickering, I. J.—Holders for welding electrodes. 1st July, 1952. (698913.)

16772. Udylite Corporation.—Electroplating of nickel. 16th July, 1951. (698998.)

17527. Metropolitan-Vickers Electrical Co., Ltd.—Aerial systems. 30th May, 1952. (698985.)

17719. Crabtree & Co., Ltd., J. A., Morgan, R. W., and Thompson, W. H.—Electric tumbler switches. 21st July 1952. Addition to 686713. (699131.)

17881. Welter, O.—Electrical commutator machine. 27th July, 1951. (698999.)

19164. Junghans Akt.-Ges., Geb.—Time-switch. 14th August, 1951. (699046.)

20811. Bloch, W. E. H.—Magnesium-silicate bodies of great mechanical strength and low dielectric loss with reduced talc content. 22nd February, 1952. (699155.)

21110. Sylvania Electric Products, Inc.—Transistors, and their method of manufacture. 6th September, 1951 (699050.)

21731. Telefunken Ges. für Drahtlose Telegraphie.—Piezo-electric crystal pick-ups. 17th September, 1951. (698989.)

22196. Soc. Industrielle de Liaisons Electriques.—Electric cables. 21st September, 1951. (698918.)

22886. Electric & Musical Industries, Ltd.—Change-speed mechanisms for talking machines. 17th February, 1950. Divided out of 698865. (698919.)

24860. Quarzlampen Ges.—Lighting apparatus which renders a shadowless illumination. 24th October, 1951. (698922.)

26661. Philco Corporation.—Electrical supply systems. 14th November, 1951. (699057.)

**1952**

2154. Telefonaktiebolaget L. M. Ericsson.—Telephone instruments. 25th January, 1952. (698927.)

4226. Philips Electrical Industries. Ltd.—High-frequency electric inductance coil assemblies. 18th February, 1952. (698930.)

11659. British Thomson-Houston Co., Ltd.—Radial-flow fans. 8th May, 1952. (698935.)

13275. British Thomson-Houston Co., Ltd.—Dish-washing machines. 26th May, 1952. (698936.)

13680. British Thomson-Houston Co., Ltd.—Distance indicating devices with reduction gearing. 11th July, 1950. Divided out of 698869. (698937.)

14007. Telefonaktiebolaget L. M. Ericsson.—Means for testing an electrical installation. 3rd June, 1952. (699138.)

18194. Babcock & Wilcox, Ltd.—Hopper bottom pulverized fuel-fired furnaces. 18th July, 1952. (699139.) 19521. Cyclone furnaces. 1st August, 1952. (698938.) 19763. Tubulous vapour generators. 6th August, 1952. (698939.)

28827. Bendix Aviation Corporation.—Commutating system for impressing upon a single transmission channel varying voltages from two separate sources. 12th June, 1951. Divided out of 698909. (698940.)

## TRADE MARKS

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered up to the dates stated:—

**26th September**

SUPERWEAVE. No. 719,557, Class 7. Portable electric generators.—British Twin Disc & Clarifiers, Ltd., Aldwych House, Aldwych, London, W.C.2.

PURHYPO. No. B.714,327, Class 9. Electrolytic apparatus for recovering silver from photographic fixing baths.—Comptoir Lyon—Alemard et Marret, Bonnin, Lebel et Guieu Réunis, Paris, France. Address for service, c/o Feeny & Feeny, 2A, Charlwood Place, Westminster, London, S.W.1.

AMPLIDEX. No. 717,371, Class 9. Error detectors, electric voltage detectors and electric current exciters; and parts included in Class 9 for all the aforesaid goods.—Brush Electrical Engineering Co., Ltd., Duke's Court, Duke Street, St. James's, London, S.W.1.

ZEROSTEM. No. 719,443, Class 9. Thermostats.—Rheostatic Co., Ltd., 94, Farnham Road, Slough, Bucks.

SAVE-UR-LIFE. No. 717,754, Class 11. Electric lamps.—Milton Alden, 419, Grove Street, Needham, Massachusetts, U.S.A. Address for service, c/o A. A. Thornton & Co., Napier House, 24–27, High Holborn, London, W.C.1.

ESEL LAMPS (design). No. B.718,032, Class 11. Electric lamp bulbs.—Stonehills, Ltd., 92, Bradshawgate, Bolton.

CONYSIL. No. 717,888, Class 17. Electric insulation materials; and electric insulators and parts thereof included in Class 17.—Connollys (Blackley), Ltd., Blackley Vale Mill, Blackley, Manchester, 9.

**2nd October**

CONSTAT. No. B712,795, Class 9. Thermostats and thermally-operated automatic electric time switches.—R. E. Thompson & Co. (Sunbury), Ltd., trading also as the Thermostatic Controls Co., Avenue Road, Hampton, Middx.

SYMPHONY. No. 717,316, Class 9. Sound amplifiers, magnetic tape sound recorders, radio feeder units, radio sets (sold complete), loudspeakers, parts included in Class 9 of all these goods and kits of parts included in Class 9 for making any of the aforesaid goods.—D. Dumville, trading as Northern Radio Services, 16, Kings College Road, London, N.W.3.

TECHNOGRAPH. No. 717,645, Class 9. Printed electric circuits and components therefor included in Class 9.—Technograph Printed Circuits, Ltd., 32, Shaftesbury Avenue, London, W.1.

ELASTOPHONE. No. 718,323, Class 9. Insulated electric wire and electric cables.—Hartley Electromotives, Ltd., 1a, Harrington Road, London, S.W.7.

SCIENTAIRE. No. 719,121, Class 9. Electrical apparatus and instruments included in Class 9.—Scientaire, Ltd., 2, Blenheim Terrace, Leeds, 2.

TOUCHLIGHT. No. B719,003, Class 11. Electric table lamps.—Hadrill & Hortsmann, Ltd., Farncombe Hill, Godalming, Surrey.

HYLUMINA. No. 719,183, Class 17. Electric insulating materials.—K.L.G. Sparking Plugs, Ltd., K.L.G. Works, Putney Vale, London, S.W.15.

## NEW ZEALAND IMPORTS

AN increase of about 15 per cent was recorded in New Zealand's electrical imports last year compared with 1952. The leading items—totalling £12,130,000—are shown in the accompanying table, with notes of increases; only one decrease is recorded. Details of the supplying countries in 1952 are not yet issued.

| Class of Equipment | 1952 £ (000) | Inc. or dec. on 1951 £ (000) |
|---|---|---|
| Batteries and cells | 196 | + 40 |
| Electrodes and carbons | 76 | + 10 |
| Generators and magnetos | 684 | + 132 |
| Cable and wire | 2,923 | + 305 |
| Insulators and parts | 203 | + 22 |
| Lamp bulbs | 277 | + 26 |
| Motors under 1 h.p. | 709 | + 75 |
| Ditto, 1–25 h.p. | 360 | + 46 |
| Ditto, exceeding 25 h.p. | 110 | + 27 |
| Motor parts, starters, etc. | 295 | + 49 |
| Electric razors | 164 | + 136 |
| Telegraph and telephone apparatus | 1,538 | + 171 |
| Transformers and convertors | 637 | + 120 |
| Other electrical apparatus | 2,874 | + 481 |
| Radio apparatus: | | |
| Valves for receiving sets | 320 | − 10 |
| Other valves | 62 | + 6 |
| Other apparatus | 488 | + 37 |
| Vacuum cleaners and parts | 214 | + 16 |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# CONTRACT INFORMATION

## Accepted Tenders and Prospective Electrical Work

### CONTRACTS OPEN

*Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.*

**Ashington.**—24th September. U.D.C. Electrical installations in 64 houses, Darnley Road. Surveyor, Council Offices.

**Australia.** — MELBOURNE. — 22nd October. Director, Posts and Telegraphs. Radio transmitting valves. (E.S.B. 2201/53. Ten/7063.)*

SYDNEY.—12th November. County Council. Relays for feeder/transformer protection. (E.S.B. 4017/53. Ten/7109.)*

**Belfast.**—30th September. Northern Ireland Hospitals Authority. Electrical installation in the administrative buildings and nurses' home and rewiring in the West House at N.I. Fever Hospital, Purdy's Burn. F. W. Parkinson & Parsons, 6, Murray Street.

1st October. Installation of electrical services at Tyrone and Fermanagh Hospital. Chief engineer, N.I. Hospitals Authority, 104, University Street.

**Egypt.**—CAIRO.—6th October. Cairo Electricity and Gas Administration. Transformers. (See this issue.)

17th October. Installation of electric pumping stations and transformers at El-Deshoudi, El Kalaa, Edku, Menufia East, Hanout and El Wadi. (E.S.B. 3686/53. Ten/7099.)*

**Formosa.**—TAIPEI.—12th October. Central Trust of China. Exhaust fans. (E.S.B. 3698/53. Ten/7104.)*

**Manchester.**—30th September. Town Council. Auxiliary equipment for street lighting, cable, street lighting lanterns, time switches and torch lamps for one year from 1st January. City surveyor, Room 329, Town Hall.

**New Zealand.**—WELLINGTON.—15th October. Post and Telegraph Department. Radio valves. (E.S.B. 3231/53. Ten/7066.)* 22nd October. Switchboard lamps. (E.S.B. 3426/53. Ten/7091.)* 27th October. Protector and fuse and carbon blocks. (E.S.B. 3232/53. Ten/7065.)*

**Pakistan.** — SODARGHAT, CHITTAGONG. — 5th October. Department of Supply and Development. Electric cables. (E.S.B. 3699/53. Ten/7088.)*

**Ryton (Durham).**—23rd September. U.D.C. Installation of electric lighting and heating in 50 houses on the Park Field North estate. Surveyor, Council Offices.

**South Africa.**—CAPE TOWN.—2nd October. Provincial Administration, Cape of Good Hope. X-ray equipment, hot food box, and electric sterilizing units. (E.S.B. 3434/53. Ten/7076.)*

JOHANNESBURG.—1st October. South African Railways. Electric cable. (E.S.B. 3929/53. Ten/7103.)* 8th October. Air-conditioning plant. (E.S.B. 3445/53. Ten/7074.)*

PRETORIA.—22nd October. Union Tender and Supplies Board. Test equipment for radio beacons. (E.S.B. 4016/53. Ten/7108.)*

**Stockton-on-Tees.**—28th September. Town Council. Electrical installation at junior school, Durham Road. Borough architect, 28, The Square.

**United States.**—SEATTLE.—29th September. Division of Purchases, City of Seattle. Three outdoor potential transformers. (E.S.B. 3824/53. Ten/7105.)*

**Walthamstow.**—2nd October. Corporation. Street lighting equipment. (See this issue.)

### ORDERS PLACED

**Manchester.**—Corporation Housing Committee. Electrical installations in 366 houses on the Langley estate, Middleton.—F. L. Bampton, Ltd.

**Sheffield.**—Housing Committee. Electrical installations in 117 dwellings at Manor Park, Scheme 5 (£3,289) and in 42 dwellings at Hackenthorpe, Scheme 4A (£704).—Hobson & Scott, Ltd. Electrical installations in 176 dwellings at Greenhill, Scheme 1 (£3,343) and in 372 dwellings at Hackenthorpe, Scheme 1A (£5,943).—M. B. Munks.

### WORK IN PROSPECT

*Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.*

**Ashington.**—Additions to hospital for Newcastle Regional Hospital Board, "Dunira," Osborne Road, Newcastle-on-Tyne; P. H. Knighton, Board's chief architect.

**Atherton (Lancs).** — Houses (104), first instalment of scheme for 900 dwellings on a new estate; J. C. Prestwich & Sons, architects to U.D.C., Bradshawgate Chambers, Leigh.

**Barnet.**—Extensions to Chest Clinic, Wellhouse Lane; North West Metropolitan Regional Hospital Board, 11, Portland Place, London, W.1.

**Basford.**—Houses (82), Calverton, Kimberley and Newthorpe, for R.D.C.; J. J. G. Ellis, housing architect, Rock House, Stockhill Lane, Basford, Notts.

**Basildon.**—Factory, Nevendon area; Morris & Mead, Ltd., 33, Great Sutton Street, London, E.C.1.

**Birkenhead.** — Showrooms and offices, Chester Road, Bebington Motors, Ltd., Kings Gap, Bebington.

*Specifications may be inspected at the Export Services Branch, Board of Trade, Lacon House, Theobald's Road, London, W.C.1 (Chancery 4411; extension 769).

**Birmingham.**—Factory extensions, 99, Bradford Street, for Trade Loose Leaf Co., Ltd.; Wallace H. Friend, 35, Cropthorne Road, Shirley, Birmingham.

Junior school, Elms Farm; Goodman & Suggitt, architects, 21, Waterloo Street.

**Bletchley.**—Houses (200), Castles estate; J. F. Smithie, U.D.C. surveyor, Council Offices.

**Brighouse.**—Factory, Wakefield Road Industrial Site; Luther Austin, Ltd., Heckmondwike.

**Buttershaw (Yorks).**—Factory for Bulmer & Lumb, Ltd.; Walker & Collinson, architects, 12, The Exchange, Bradford.

**Chadderton.**—Houses (152), Stanley Road estate; U.D.C. surveyor.

**Cumberland.**—Old people's homes, Whitehaven (£13,000) and Cockermouth (£7,000), and 21 nurses' houses in various parts of the county; county architect, Portland Square, Carlisle.

**Darlaston.**—Shops, flats and maisonnettes, Bentley estate; G. R. Rowlands, clerk to U.D.C., Town Hall.

**Darlington.**—Old people's hostel to accommodate 30 people; borough architect, Central Buildings.

**Durham.**—Old people's hostel at Seaton Carew (£5,900) and long-stay home at Peterlee (£5,400); county architect, Court Lane, Durham.

**Easington.**—Houses (164) to rehouse slum-dwellers; R.D.C. surveyor.

**Eastleigh.**—Fire and ambulance stations, houses, etc., for Hants C.C.; county architect, The Castle, Winchester.

**Gateshead.**—Health centre clinic, Carr Hill Road (£11,000); G. F. Winters, borough engineer.

**Heald Green (Ches).**—Church, Outward Road; S. W. Nicholson, architect, 2, Dewey Avenue, Aintree, Liverpool.

**Hereford.**—Oil storage depot, Mortimer Road; Regent Oil Co., Ltd., 117, Park Street, London, W.1.

**Hornchurch.**—Factory and offices, Southend Arterial Road; H. Webb (Builders), Ltd., Bridge Yard, Gallows Corner, Romford.

**Ilford.**—Office block, 290/296, High Road; Porte & Partners, architects, 16, Devonshire Square, London, E.C.2.

Houses (33), Eastern Avenue; Stoneley & Co., Ltd., 258, Green Lane.

Hardening shop and switchgear house; Essex Works, Ltd., High Road.

Public baths, Barkingside; town clerk, Town Hall.

**Leek.**—Flats (40), Haregate estate; U.D.C. surveyor.

**Leicestershire.**—Fire stations at Kibworth and Syston; and aged persons' homes at Ashby-de-la-Zouch and Melton Mowbray; T. A. Collins, county architect, London Road, Leicester.

**Liverpool.**—Factory for Dellagana & Denby, Ltd.; A. E. Shennan, architect, 17, North John Street, Liverpool.

**London.** — City. — Warehouse and offices, Chiswell Street; Goode, Durrant & Murray, Ltd., 197, Great Portland Street, W.1.

Lewisham.—R.C. secondary school, Belmont Hill; Clayton & Black and Partners, architects, 10, Bayley Street, W.C.1.

South Lambeth.—Factory, offices and warehouse, Wandsworth Road; Chamberlain Industries, Ltd., Staffa Road, E.10.

**Maryport.** — Out-patients' department at Maryport Cottage Hospital for Newcastle Regional Hospital Board; N. Edgar, divisional architect, 1, Lonsdale Street, Carlisle.

**Midhurst.**—Houses at Linchmere (36) and at Elsted (8), for R.D.C.; T. Greenfield, architect, Newstead, Midhurst, Sussex.

**Newcastle - on - Tyne.** — Extensions to Cremona Confectionery Works, Benton Road; C. Errington, 46, Grainger Street.

Factory for Gregory & Spence; Stephen Easten, Ltd., Westgate Grange.

**North Riding.**—Schools at South Bank (£45,700) and at Thornaby (£56,000) for the C.C.; D. W. Dickenson, school architect, County Hall, Northallerton.

Ambulance station at Richmond (£11,000); H. J. Knowles, county architect, County Hall, Northallerton.

**Northumberland.**—Infants' school, Willington Quay, Wallsend; county architect, County Hall, Newcastle-on-Tyne.

**Plympton St. Mary.**—Houses (38), Yealmpton; surveyor, Rural Council Offices, Plympton, Devon.

**Redcar.**—Houses (80), Lakes estate; town clerk, Municipal Buildings.

**Sheffield.**— Houses (69); Oxley & Bussey, architects, 91, Pinstone Street.

**Slough.**—Houses, etc. (792), Wexham site; borough surveyor, Town Hall.

**Smethwick.**—Workshop and offices, Bridge Street; Smethwick Drop Forgings, Ltd., Rolfe Street.

**Sodbury.**—Houses (24), Yate Aerodrome site; surveyor, Council Offices, Chipping Sodbury, Bristol.

**Sunderland.**—Bus repair depot at Olive Street for the Northern General Transport Co., Ltd., Gateshead.

**Warrington.**—Pumping stations for Sankey Valley drainage scheme; Binnie, Deacon & Gourley, consulting engineers, Artillery House, Artillery Row, S.W.1.

**Wigan.**—Rebuilding business premises, after fire; Pendlebury & Co., Ltd., drapers, furnishers, etc.

**Wisbech.**—First stage of college of further education; R. D. Robson, County Hall, March.

**Worcester.**—Development of Market Hall as a shopping arcade; Norman Sinclair, Ltd., 80, Uxbridge Road, London, W.13.

## Supplies for Colombia

**A firm of agents in Bogotá, Colombia, offers to act in Colombia on behalf of British manufacturers of electrical installation material. We will pass on the name of the firm to any interested readers.**